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Diseases of Vegetable and Field Crops in the United States in 1925

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BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

DISEASES OF FIELD AND VEGETABLE CROPS IN THE UNITED STATES IN 1925

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C O N T E N T S

Table A. Departure from the normal temperature and rainfall by states - April to September.
(Figures taken from United States Department of Agriculture Monthly Weather Review 53: 1925.)

1925

State	Departure from normal											
	Temperature (°F)						Precipitation (inches)					
	April	May	June	July	August	September	April	May	June	July	August	September
New Eng.	+1.9	-2.4	+3.0	-1.0	+0.1	-0.1	-1.08	-0.93	+0.71	+0.83	-1.72	+0.35
N. Y.	+2.0	-4.1	+3.3	-2.0	+0.3	+0.6	-0.29	-0.81	+0.59	+0.89	-1.29	+1.49
N. J.	+2.1	-2.6	+5.1	-1.5	-0.9	+2.1	-1.22	-0.93	-0.64	+2.78	-2.71	-0.71
Pa.	+2.5	-4.9	+4.1	-1.8	-0.7	+3.9	-1.02	-0.30	-1.19	+1.55	-2.24	-0.59
Del.-Md.	+2.7	-3.9	+4.8	-0.5	-1.6	+4.2	-0.77	-1.70	-1.69	+0.68	-1.84	-1.53
Va.	+2.7	-4.6	+4.2	+0.7	-1.6	+5.3	-0.73	-1.78	-1.79	-1.53	-2.12	-1.58
N. C.	+3.5	-2.9	+3.1	+2.1	-0.3	+6.2	-1.34	-1.27	-0.99	-3.18	-2.63	-1.96
S. C.	+3.7	-2.7	+2.8	+1.7	+1.3	+7.3	-0.92	-1.46	-1.71	-2.70	-4.40	-2.14
Ga.	+4.1	-1.7	+2.5	+2.1	+1.1	+8.6	-1.84	-1.59	-1.75	-2.28	-3.73	-2.10
Fla.	+0.4	-1.6	+0.2	+0.3	+0.1	+3.6	-1.25	+1.69	-0.38	+0.18	+0.03	-4.30
Ala.	+4.8	-1.3	+2.9	+1.6	+1.7	+8.2	-2.94	-1.79	-2.06	-0.83	-3.17	-0.85
Miss.	+5.2	-1.0	+2.0	+1.6	+0.6	+7.5	-4.26	-1.43	-1.78	-0.51	-2.02	-0.24
La.	+3.9	-1.4	+1.5	+1.4	+0.4	+4.2	-3.72	-1.73	-0.68	-0.98	-1.98	+1.69
Texas	+5.4	+0.6	+3.3	+2.7	0.0	+2.0	-1.19	-1.01	-1.86	-0.69	-0.38	+1.53
Tenn.	+5.2	-3.1	+4.1	+1.8	+1.0	+8.9	-1.15	-2.20	-1.54	-1.21	-2.63	-0.52
Ky.	+5.3	-4.4	+3.1	-0.2	+0.8	+7.0	-0.86	-1.39	-0.19	-0.29	-2.24	+0.03
W. Va.	+3.4	-4.8	+3.1	-0.9	-0.9	+5.0	-0.80	-0.84	-0.51	+0.21	-2.14	-0.73
Ohio	+4.2	-5.2	+3.6	-1.7	+0.3	+4.6	-1.23	-1.11	-0.98	+0.89	-1.12	+0.90
Ind.	+5.6	-4.1	+3.2	-0.9	+0.3	+6.2	-1.21	-2.80	-0.03	+0.82	-0.76	+2.22
Ill.	+6.8	-3.4	+3.2	-0.1	+0.5	+6.2	-0.75	-2.85	+1.19	-0.48	-0.78	+1.46

State	Temperature (°F) April	May	June	July	August	September	Precipitation (inches) April	May	June	July	August	September
	Departure from normal											
Mich.	+5.0	-2.9	+2.9	-1.4	+2.0	+2.4	-0.47	-2.26	-0.67	+0.33	-0.51	+0.67
Wis.	+5.6	-2.9	+1.3	-1.1	+1.7	+3.4	-0.41	-2.70	+2.12	+0.57	-1.04	+1.18
Minn.	+6.5	-1.7	-1.0	-1.9	+2.8	+2.9	+0.02	-1.74	+2.82	-0.43	-1.11	+1.38
Iowa	+7.6	-2.4	+1.1	+0.3	+0.7	+4.7	-0.79	-3.45	+2.11	-1.19	+0.03	+1.39
Mo.	+5.9	-3.4	+3.0	+0.5	+0.5	+5.6	+0.38	-2.56	+1.43	-1.34	-0.23	+2.73
Ark.	+6.2	-1.2	+5.5	+1.9	+0.9	+6.6	-2.16	-3.24	-2.00	+1.07	-2.02	+2.63
N. Dak.	+6.1	+1.0	-1.3	-0.8	+2.5	+1.7	+0.26	-1.11	+2.57	-1.27	-1.21	+1.10
S. Dak.	+7.6	+0.6	-0.7	-0.4	+3.3	+4.3	-0.44	-1.45	+2.22	-0.99	-1.01	-0.67
Nebr.	+6.2	-0.3	+1.6	+0.9	+0.2	+3.7	-0.06	-1.49	+0.66	-1.24	+0.65	-0.32
Kans.	+6.2	-0.2	+4.5	+0.8	+0.1	+3.3	+0.92	-1.63	+0.05	-0.20	+0.35	+1.30
Okla.	+6.6	+0.3	+6.2	+2.8	0.0	+2.6	+1.12	-2.24	-1.94	+1.13	-1.66	+3.25
Mont.	+4.5	+2.9	+0.4	+2.3	-0.2	-0.3	+0.81	-0.86	+0.23	-0.38	-0.27	+0.87
Wyo.	+4.4	+3.1	-1.0	+1.4	-0.9	+0.7	+0.14	-0.20	+0.87	+0.16	+0.32	+0.11
Colo.	+4.2	+3.7	+0.5	[illegible]	-1.3	+0.7	-1.45	-0.40	+0.51	+0.48	+0.75	+0.42
N. Mex.	+4.2	+3.0	+1.1	+1.1	-1.8	-0.3	-0.95	+0.19	-0.45	+0.78	+0.51	+0.45
Ariz.	+2.2	+3.6	-1.5	+1.2	-1.4	-1.9	+0.18	-0.13	+0.83	-0.43	-0.18	+0.82
Utah	+2.2	+4.1	-2.6	+1.6	-1.6	-1.1	-0.04	-0.40	+1.38	+0.32	+0.62	+0.37
Nev.	+1.7	+4.0	-0.4	+1.6	-2.7	-2.9	+0.61	-0.08	+0.67	+0.56	+0.45	+0.34
Idaho	+2.7	+3.9	+0.3	+2.9	-1.4	-0.5	+0.31	-0.24	+0.38	+0.01	+0.38	+0.42
Wash.	+2.5	+3.0	+1.4	+2.7	-0.5	+0.6	-0.13	-0.17	-0.50	-0.52	-0.16	-0.62
Oregon	+2.6	+3.2	+1.3	+2.9	-1.2	-0.2	+0.55	+0.32	-0.27	-0.34	+0.18	+0.23
Calif.	+0.2	+1.8	+1.0	+1.4	-1.4	-3.1	+1.16	+0.67	+0.27	+0.08	+0.13	+0.01

INTRODUCTION

The summary of the occurrence of diseases of field and vegetable crops in the United States in 1925, which follows, is based upon information received from several sources, among which are the reports of collaborators, data contributed by state and federal pathologists, and the published results of recent work. The value of the summary is dependent largely upon the completeness and accuracy of the reports received from collaborators, therefore, it is highly desirable that the records submitted be made as full and exact as possible.

OUTSTANDING OBSERVATIONS

One of the most noteworthy observations in 1925 was the effect of the unusually dry summer upon the occurrence of certain diseases. This was especially noticeable in the case of cotton anthracnose. The losses reported in 1925 ranged from a trace to 1 per cent, whereas in 1920 when precipitation was high, the losses estimated were from one to 15 per cent. Potato late blight, cantaloupe leaf blight, and tomato leaf spot also caused much less loss than during years of average rainfall.

A gratifying observation is the fact that the losses from several important diseases are being reduced through the practice of seed selection and treatment, use of resistant varieties, sanitation, care in handling, spraying and dusting, and other control measures. The most striking instances of this can be found in the case of sweet potato black rot and storage rots. In the first instance losses have been reduced from 5.64 per cent in 1919 to 1.8 per cent in 1925, while with storage rots the losses decreased from 30.3 per cent in 1918 to 6.9 per cent in 1925. Other diseases, the losses from which have been lowered by the application of control measures, are potato scab and mosaic, tomato wilt, cabbage yellows, cantaloupe blight, celery blight, watermelon anthracnose, and tobacco wildfire and blackfire.

DISEASES OF POTATO

SPRAYING AND DUSTING FOR POTATO DISEASES

Spraying with Bordeaux combined with arsenicals continues to be regarded as necessary in most regions for the profitable production of potatoes. Dusting with copper-lime dust combined with arsenicals has given satisfactory results in some cases, but generally it has not given as good control of late blight and hopperburn as has spraying.

In Maryland spraying with Bordeaux is gradually being adopted by the best growers of late potatoes, resulting in a decrease in the losses from diseases, especially late blight and hopperburn.

In South Carolina Bordeaux sprays and dust are being used effectively, according to Fenner. Butler in New Hampshire (2) found that Bordeaux applied at 90 pounds pressure did not give as satisfactory control of blight as it did when applied at 180 pounds pressure. He also found that best results were obtained when the nozzles over the center of the row were directed upon it perpendicularly to the line of motion or at an acute angle, never an obtuse angle, to it.

Dean (4), after twenty years personal experience, believes that late blight can be controlled only by frequent and thorough spraying of the plants throughout the growing season.

Dimock (6) obtained five out of seven crops free from decayed tubers by dusting. He believes that wherever the water supply is limited or difficult of access or labor is high priced, dust should replace wet spray.

Wallace (9) began experimental work with dusts in 1917. None of the dusts used previous to 1924 gave satisfactory results under the conditions of their application, but during that year fairly satisfactory results were secured from certain dusts especially when they were applied between three and five o'clock in the morning.

Recent literature

1. Anon. Sprays outrank dusts for potatoes. New York (Geneva) Agr. Exp. Sta. Bul. 518: 4 pp. 1925.

2. Butler, O. R. Field crops experiments in New Hampshire, 1924. New Hampshire Agr. Exp. Sta. Bul. 216: 16-18, 32, 33. 1925.

3. Clinton, G. P. Report of the Connecticut State Station Department of Botany. Connecticut State Agr. Exp. Sta. Bul. 264: 207-210. 1925.

4. Dean, D. Spraying in 1925. Potato News Bul. 2: 193-196. May 1925.

5. ______ High pressure spraying machinery. Proc. Potato Assoc. America 11: 84-86. 1925.

6. Dimock, J. A. Potato dusting vs. spraying in Vermont. Proc. Potato Assoc. America 11(1924): 74-76. 1925.

7. Martin, W. H. Potato spraying vs. dusting in New Jersey. Proc. Potato Assoc. America 11 (1924): 67-74. 1925.

8. Tilford, P. E. Potato spraying and dusting in 1924. Mo. Bul. Ohio Agr. Exp. Sta. 10: 20-22. 1925.

9. Wallace, Errett. Seven years tests with commercial dusting materials against potato blight. Proc. Potato Assoc. America 11 (1924): 86-95. 1925.

POTATO SEED TREATMENT

Seed treatment continues to be a valuable method for the control of certain potato diseases, especially for Rhizoctonia and scab. The data received on the subject of seed treatment are included in the discussion of these diseases.

Recent literature (see also references under Scab and Rhizoctonia)

1. Cross, L. J. A field test of mercuric chloride solution in potato seed treatment. Phytopath. 15: 241-242. 1925.

2. Heckmanns, F. Zur Frage der Kartoffelbeizung mit Uspulun und Uspulun-bolus. Illus. Landw. Zeit. 44: 247-249. June 13, 1924.

3. Lohmann, J. Reizwirkungen chemischer Verbindungen auf die Keimung der Kartoffelknolle. (Stimulatory effects of chemical compounds on the germination of the potato tuber.) Landw. Jahrb. 61: 1-44. 1925.

4. Martin, W. H. The use of organic mercury dust for disinfecting seed potatoes. Proc. Potato Assoc. America 11(1924): 116-121. 1925.

5. Porter, D. R. The introduction of the hot-formaldehyde treatment for seed potatoes in Iowa. U. S. Dept. Agr. Office Coop. Exten. Work Ext. Pathologist 3: 6-11. Jan.-Feb. 1925.

6. ________ Potato seed treatment in the Kaw Valley. Potato News Bul. 2: 270-273. July 1925.

7. Quinn, J. T. Investigations with seed potatoes. Missouri Agr. Exp. Sta. Bul. 228: 61. 1925.

8. Rosa, J. T. On the preparation of mercuric chloride solutions. Proc. Potato Assoc. America 11(1924): 113-115. 1925.

POTATO SEED CERTIFICATION

Potato seed certification continues to be the best method which has been devised to encourage and increase the use of healthy, vigorous potato seed.

The report of the Seed Potato Improvement Committee for 1924 (6) is of interest. The committee, through Chairman Werner, sums up the seed certification work, as regards noticeable changes or advancement as follows:

1. Increased number of field inspections.
2. Improved grading of certified seed.
3. More rigid control of virus diseases because of better knowledge of symptoms and control methods.
4. Use of trial plots for checking the quality of the work and the efficacy of the standards, also as a direct aid to actual inspection work.

5. Very great increase in the volume of certified seed produced.

Recent literature

1. Krantz, F. A. Potato improvement by selection in self-fertilized lines. Potato News Bul. 2: 303-304. August 1925.

2. Martin, W. H. Potato improvement work in 1925. Hints Potato Grow. New Jersey State Potato Assoc. 5 12 : 1-2. April 1925.

3. Myers, C. H. How to improve the yield and quality of seed potatoes by selection and to maintain such improvement. Proc. Potato Assoc. Amer. 11(1924): 5-14. 1925.

4. Sanders, V. A. Estimated crop of certified seed potatoes in northeastern region gains 155 per cent over 1923. Potato News Bul. 2: 24-26. 1925.

5. Talmage, H. R. How can best strains of a variety of seed potatoes be located and maintained? Proc. Potato Assoc. Amer. 11(1924): 15-20. 1925.

6. Werner, H. O. Report of seed potato improvement committee. Proc. Potato Assoc. Amer. 11(1924): 130-136. 1925.

LATE BLIGHT CAUSED BY PHYTOPHTHORA INFESTANS (MONT.) D BY

With the exception of New York and Maine, collaborators' reports indicate that the losses from late blight throughout the country were much less than usual. At one time it was reported serious in Florida but later reports indicated that this condition was not general.

Table 1. Estimated average percentage loss from and relative prevalence of late blight in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with: 1924	Prevalence compared with: Average year	State	Estimated percentage loss 1925	Prevalence compared with: 1924	Prevalence compared with: Average year
N. Y.	20	More	More	W. Va.	Trace	Less	Less
Maine	5	--	--	S. C.	Trace	Less	Less
Md.	3	Same	Less	Mich.	Trace	Less	Less
N. H.	1	--	Less	Iowa	Trace	--	--
N. C.	1	Less	Less	Ky.	--	Same	Same
Conn.	0.5	More	Same	Ga.	--	Less	Less
Ohio	0.5	Less	Same	Fla.	--	Less	--
Calif.	0.1	Same	--	Wis.	--	Less	Less
Mass.	Trace	Less	Less				

Table 2. Dates and places of first appearance of late blight as reported by collaborators, 1925.

Date	State	Place	Date	State	Place
May 13	South Carolina	Charleston	July 27	New York	Tompkins
July 19	Massachusetts	Amherst	Aug. 22	Wisconsin	Amherst
July 25	Connecticut	Storrs	Sept. 25	Michigan	Paw Paw

Weather relations

The absence of late blight throughout the country was probably due to the low precipitation and high temperature which prevailed during the growing season, especially during August and September (See Table A). New York is the only important potato growing state in which there was an appreciable increase in rainfall over normal for September (+1.49 inches) combined with almost normal temperature (+0.6°F.). The normal September temperature and rainfall in New York are usually favorable for late blight development provided there is sufficient moisture earlier in the season to favor the growth of the fungus. It will be noted in table A that the rainfall for New York during July was almost an inch above normal (+0.89 inch). This combination of conditions probably accounts for the severe losses from late blight, especially from tuber rot, reported in that state.

Maine: According to Folsom 1925 was one of the worst blight years since 1909.

Connecticut: Late blight present only in a minor way and came too late to cause much injury, either to vines or as rot of tubers. (Clinton)

New York: Most of the loss was due to tuber rot, but many of the fields died prematurely and thus reduced the yield. The worst rot was in Genesee County. It was a common sight to see from 50 to 200 bushels of rotted tubers an acre, left lying on the ground. (Chupp, Barrus, and Fernow)

Maryland: Late blight is almost always more or less severe in the Allegheny Mountains, especially in Garrett County. Those who spray thoroughly with Bordeaux usually check its development but losses are usually large in untreated fields. (Jehle & Temple)

Florida: The most serious trouble we had was late blight. The fungus seemed to be particularly virulent this year and did serious damage even when it seemed weather conditions were decidedly unfavorable. (L. O. Gratz, May 7)

Not as important during the past season as the year before, in fact, very little damage was caused in the Hastings Section. (Weber)

Wisconsin: The least amount of rot since 1916. (Vaughan)

For control see section on potato spraying.

Recent literature (See also literature cited under spraying)

1. Butler, O. Effect of spray pressure and number of nozzles on late blight of potatoes. New Hampshire Agr. Exp. Sta. Circ. 24: 4pp. 1925.

2. Gratz, L. O. Blight diseases of Irish potatoes. Florida Grow. 31[10] 20. March 7, 1925.

3. Leonian, L. H. Physiological studies on the genus Phytophthora. West Virginia Agr. Exp. Sta. Sci. Paper 11. Reprinted from Amer. Jour. Bot. 12: 444-498. July 1925.

4. Murphy, Paul A., and Robert McKay. Further experiments on the sources and development of blight infection in potato tubers. Jour. Dept. Lands & Agr. Ireland 25: 10-21. 1925.

5. Simonet. Note sur le Phytophthora infestans. Jour. Soc. Nat. Hort. France IV, 26: 272-274. July 1925.

6. Stacchiotti, U. Attenti alla Peronospora della patata (Phytophthora infestans). Istria Agr. n. s. 5: 245-248. June 15, 1925.

7. Watkins, W. R., et al. Farmers' experiment plots. Potato trials, 1924. Agr. Gaz. New South Wales 36: 269-279. 1925.

EARLY BLIGHT CAUSED BY ALTERNARIA SOLANI (ELL. & MART.) JONES & GROUT

Reports from collaborators indicate that although early blight was present in practically all potato growing regions, it was not responsible for any severe reduction in yield. It was reported to be more prevalent than usual in Delaware, Ohio, Michigan, Nebraska, and Oklahoma. The largest loss was reported from New Mexico, where the disease was said to be most prevalent at high altitudes in Otero County. Varieties reported to be most susceptible are Early Ohio, Green Mountain, Cobbler, and Bliss.

Table 3. Dates and places of first appearance of early blight as reported by collaborators, 1925.

Date	State	Place	Date	State	Place
May 13	South Carolina	Charleston	July 7	New Jersey	Shiloh
May 16	Georgia	Pavo	July 30	Wisconsin	Spooner
June 3	Kansas	Lawrence	Aug. 10	New York	Ontario County
July 1	Michigan	E. Lansing			
July 7	New Hampshire	Rochester	Aug. 10	New Mexico	Cloudcroft

Table 4. Estimated average percentage loss from and relative prevalence of early blight in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year	State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year
N. Mex.	6	More	More	Ga.	Trace	Less	Less
Ariz.	2	--	--	Minn.	Trace	Less	Less
Me.	2	--	--	Iowa	Trace	Same	--
Del.	1.5	More	More	N. Dak.	Trace	Less	--
N. C.	1.5	--	--	S. Dak.	Trace	Same	Same
Ohio	1.5	More	More	Kans.	Trace	Same	Same
Va.	1	--	--	Idaho	Trace	Less	Less
S. C.	1	--	--	N. J.	-	Less	Less
Ala.	1	Same	Same	Fla.	-	Same	--
Mich.	1	More	Same	La.	-	Less	Less
Md.	0.5	Same	Same	Okla.	-	More	--
Conn.	0.25	Same	Less	Ind.	-	Same	--
N. H.	Trace	--	--	Wis.	-	Same	Same
Mass.	Trace	More	Same	Nebr.	-	--	More
N. Y.	Trace	--	--	Utah	-	Same	Same
W. Va.	Trace	Same	Same				

Collaborators' notes

Maine: Unusual epidemic on Green Mountains and other late varieties. (Folsom)

Massachusetts: Generally present but causing relatively little damage. (Osmun & Davis)

Maryland: Very prevalent on fall grown Cobblers in Worcester County. (Jehle & Temple)

Michigan: One case of Alternaria tuber infection observed, similar to that described by Folsom & Bonde (1). (Kotila)

Last year Folsom and Bonde (1) reported the early blight fungus, Alternaria solani, as the cause of a tuber rot. This year Gratz and Bonde (2) reported further results with tuber inoculations at the meeting of the American Phytopathological Society at Kansas City. Infection resulted when the tubers were inoculated and stored under either moist or dry conditions, the latter producing the most typical lesions. High percentages of infection were obtained under all conditions, but the best results were obtained by inoculating moist tubers and drying them before storing.

Recent literature

1. Folsom, Donald, and Reiner Bonde. Alternatia solani as a cause of tuber rot in potatoes. Phytopath. 15: 282-286. 1925.

2. Gratz, L. O., & Reiner Bonde. Alternaria tuber rot of potatoes. (Abstract) Phytopath. 16: 68. Jan. 1926.

SCAB CAUSED BY ACTINOMYCES SCABIES (THAX.) GUSSOW

Scab continues to be reported in practically all of the potato growing states. In 1925 the greatest losses were reported from a few of the middle western and eastern states. It was reported to be very severe in western Nebraska. Rosa reported an unusual amount of scab on the early crop in California and writes that it was more serious where the crop was irrigated than under non-irrigated conditions. In Maryland scab was unusually severe in fall grown Cobblers in Worcester County on the Eastern Shore.

Table 5. Estimated average percentage loss from and relative prevalence of scab in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year	State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year
Kans.	10	Less	More				
N. Y.	7	--	--	N. H.	-	Same	Same
Va.	5	--	--	Conn.	-	Same	Same
Iowa	5	More	--	Mass.	-	Same	Same
N. J.	4	More	Same	Del.	-	More	More
N. C.	3	--	--	Ky.	-	Less	Less
Md.	2	Same	Same	S. C.	-	Same	Same
N. Mex.	2	Same	Same	Miss.	-	--	Same
Ariz.	2	--	--	La.	-	Same	Same
Ala.	1	Same	Same	Ohio	-	Less	Same
Minn.	1	Same	Same	Ind.	-	Same	--
Texas	0.5	--	--	Mich.	-	Same	--
Calif.	0.2	--	--	S. Dak.	-	Same	Same
Ga.	Trace	Same	Same	Utah	-	Less	Less
N. Dak.	Trace	Same	Less	Idaho	-	More	More

Table 6. Dates and places of first appearance of scab as reported by collaborators, 1925.

Date	State	Place	Date	State	Place
June 1	Kansas	Topeka	Aug. 25	New Hampshire	Wolfboro
July 20	New Mexico	Mesilla Park	Sept. 1	New Jersey	Monmouth County
July 31	Connecticut	Westport			

Varietal susceptibility

In California, scab is reported to be more severe on Cobbler than on White Rose or Earliest-of-All. In Idaho, Idaho Rural and other white and red potatoes are said to be much more susceptible than Netted Gem. In Maryland, much more scab was found on Cobbler than on Jersey Redskin or McCormick.

Control

In Maryland, scab was checked to a large extent by seed treatment with bichloride of mercury. In Kansas, White reports that seed treatment gave practical control and that hot formaldehyde gave better results than bichloride of mercury. R. F. Crawford reports good control in New Mexico by using formalin, or Bayer's Organic Mercury Dust.

Recent literature

1. Anon. Rainfall and scab. Hints Potato Grow. New Jersey State Potato Assoc. 5: 7,8. Jan. 1925.

2. Barrus, M. F. Control of potato scab. Potato News Bul. 2: 107-108. March 1925.

BLACKLEG CAUSED BY BACILLUS PHYTOPHTHORUS APPEL

According to collaborators' reports blackleg was somewhat more destructive than usual, especially in some of the western and middle western states. Blackleg is usually restricted to local areas and reports from collaborators indicate that such is the case this year. Thus, in New Hampshire it was most prevalent in Coos County; in Maryland, in Worcester County; in Kansas, in the Kaw Valley; in Ohio, in the northern half of the state; in North Dakota, in the eastern part; and in West Virginia, in the Ohio Valley. In California it was reported to be localized in the San Francisco region and in Minnesota it was reported to be very bad in the northwestern part of the state. New York and Oregon report blackleg to be general and Delaware reports it on the early crop.

Table 7. Estimated average percentage loss from and relative prevalence of blackleg in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year	State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year
Maine	5	--	--	Utah	0.5	--	--
Minn.	3	More	More	Idaho	0.5	More	--
Iowa	3	--	--	Conn.	0.25	Less	Less
Kans.	3	More	More	Ind.	0.1	More	--
N. Dak.	2	Same	Same	Mass.	Trace	Same	Same
Md.	1	Same	Same	Mich.	Trace	Less	Less
Va.	1	--	--	Wis.	Trace	--	--
W. Va.	1	--	--	Wash.	Trace	--	--
N. C.	1	--	--	Calif.	Trace	--	--
Ohio	1	Same	More	N. H.	-	Same	Same
S. Dak.	1	Same	Same	N. J.	-	Less	Less
N. Mex.	1	--	--	Oregon	-	More	More
N. Y.	0.5	--	--	Del.	-	Same	Same
Ariz.	0.5	--	--				

Table 8. Dates and places of first appearance of blackleg as reported by collaborators, 1925.

Date	State	Place	Date	State	Place
May 18	Kansas	Topeka	June 8	New Jersey	Mercer Co.
May 19	Mississippi	Charles Co.	July 27	New Hampshire	Colebrook
May 21	North Carolina	Wayne Co.	July 31	New York	Genesee Co.
June 3	Indiana	Knox Co.	Aug. 10	New Mexico	Cloudcroft
June 5	Connecticut	Clintonville			

Reports of collaborators

Virginia: Numerous cases of blackleg appeared in May. It is certainly present to an alarming degree on both Canada and Maine stock. (McWhorter)

Florida: More or less conspicuous through the fields, causing a very small loss on the average. In certain fields it caused as much as 10 per cent reduction in yield. (Weber)

Oklahoma: Killing about two per cent of plants in a twenty-acre field of Irish Cobblers near Bixby. (Rolfs, July 1)

Ohio: Blackleg plants can be found in every field of late potatoes. It seems more prevalent in fields from northern grown seed. . . It has not been so prevalent this season as last, undoubtedly because of drier weather. (Tilford, Sept. 1 and Aug. 1)

Minnesota: Blackleg continues to be abundant, although dry weather has probably lessened the amount of tuber rot in the field. (Sect. Pl. Path.)

Indiana: One trainload of Cobblers and Ohios from Minnesota gave severe blackleg in many localities. (Gregory)

Kansas: Blackleg was much more severe than normal this year; causing almost a total loss in one field noted in Leavenworth County, and an average loss in the Kaw Valley of about three per cent. Practically all infection is early infection, causing death of plants on June 1 or before. Late infection is more or less rare. (White, Nov. 18)

Oregon: General and in some fields serious but losses will probably not exceed those of previous years. (Barss)

In one field at Lebanon, 20 per cent infection was noted. No treatment was used. Slimy rotted tubers were sorted out before planting in the spring. (McKay)

Kotila and Coons (1) have obtained successful results with inoculations on tomato and _Nicotiana_ _rustica_ with the blackleg organism. The tomato has been inoculated successfully by other investigators but _Nicotiana_ _rustica_ is a new

host. Negative results were obtained from frequent inoculations into Petunia, Solanum dulcamara, Datura stramonium, Physalis spp., Nicotiana tabacum, and a solanaceous plant sold by seedsmen under the name of wonderberry (Solanum nigrum). The disease has not been observed by Kotila and Coons in nature on susceptible hosts other than potato.

Leach (2, 3, 4) has found that,

> "The seed-corn maggot (Phorbia fusciceps Zett.) is an agent of dissemination, inoculation, and hibernation of bacteria capable of causing blackleg. Bacteria are constantly associated with the insect and are necessary for the normal development of the larvae. Bacteria do not occur inside of the eggs, but are commonly present on the surface. Virulent pathogenic bacteria are present in the puparia and emerge with the adult. Pathogenic bacteria also are commonly present in the intestinal tract and excrement of adult flies. Eggs are deposited in the soil on or near healthy seedpieces or sprouts. On hatching, the maggots burrow into the seedpiece and inoculate it with bacteria which spread into the stem, causing blackleg. The insect has been responsible for outbreaks of blackleg in fields planted with carefully treated seed from fields known to have been free from blackleg. Control measures have not been devised." (4)

Recent literature

1. Kotila, J. E., & G. H. Coons. Investigations on the blackleg disease of potato. Michigan Agr. Exp. Sta. Tech. Bul. 67: 1-29. May 1925.

2. Leach, J. G. Corn maggot spreads the potato blackleg. Seed World 17: 20. April 24, 1925.

3. ________ The seed-corn maggot and potato blackleg. Science n. s. 61: 120. Jan. 30, 1925.

4. ________ The relation of the seed-corn maggot to potato blackleg. (Abstract) Phytopath. 16: 68. Jan. 1926.

STEMROT AND SCURF CAUSED BY CORTICIUM VAGUM BERK.& CURT.

The Rhizoctonia disease was reported by collaborators to be more prevalent than last year and than average years. The largest losses are reported from the middle western states, varying from 4 per cent in Minnesota to 10 per cent in Iowa. South Carolina also reported a loss of 10 per cent. Nebraska reports considerable.

Table 9. Dates and places of first appearance of stemrot and scurf as reported by collaborators, 1925.

Date	State	Place	Date	State	Place
March 30	Georgia	Thomas Co.	May 22	New Jersey	Burlington Co.
April 9	South Carolina	Sheldon	June 15	Michigan	Rhinelander
May 1	Kansas	Topeka	June 22	New Hampshire	Concord
May 21	North Carolina	Wayne Co.	July 13	New York	Genesee Co.

Table 10. Estimated average percentage loss from and relative prevalence of stemrot and scurf in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year	State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year
S. C.	10	More	More	Va.	2	--	--
Iowa	10	More	--	N. C.	2	Same	--
Kans.	8	Same	Same	Wash.	2	--	--
Ky.	5	More	More	Utah	0.3	--	--
Mich.	5	Same	--	Conn.	0.25	--	--
Ariz.	5	--	--	Maine	Trace	--	--
N. Y.	4	--	--	N. H.	Trace	--	--
Ohio	4	More	More	W. Va.	Trace	Same	Same
Minn.	4	More	More	Ga.	Trace	Less	Less
N. Dak.	4	Same	More	Ala.	Trace	--	--
S. Dak.	4	Same	Same	Del.	-	Same	Same
Md.	3	Same	Same	La.	-	Same	Same
N. J.	3	More	--	Wis.	-	Less	Less
Idaho	3	More	--	N. Mex.	-	More	More
Calif.	3	More	More	Oregon	-	More	Same
Mass.	2	Same	Same				

It is of interest to note that many of the collaborators report a reduction in stand due to rotting of the seed pieces and killing of the sprouts.

<u>New York:</u> Onondaga County - Rhizoctonia injury was quite heavy, many weak and missing hills being the result. (D. D. Ward, N. Y. State Coll. Agr. Depts. Pl. Path. & Ent. Weekly News Letter, July 20.)

<u>Maryland:</u> There was a reduction of 10 to 25 per cent in stand in early Cobblers on the Eastern Shore due to Rhizoctonia injury of the sprouts and rotting of the seed pieces. (Jehle & Temple)

<u>South Carolina:</u> Moore states that it has caused a heavier loss to sprouting potatoes this season than ever before, many fields being entirely ruined.

<u>Georgia</u> (southern): Boyd states that there occurred an appreciable reduction in stand together with noticeable numbers of "weak" hills due to Rhizoctonia, especially in home gardens and small truck fields.

<u>Ohio:</u> In some fields there is a big loss due to Rhizoctonia. There are many missing and weak hills in such fields. Cankers or lesions are in abundance on the underground parts of these weak plants. (Tilford)

<u>Wyoming:</u> In the Laramie section Rhizoctonia was observed more than any

other fungous disease, but was very slight in amount generally. (H. G. MacMillan)

Colorado: Rhizoctonia is generally prevalent in the Carbondale section, and while it did not cause a falling off in stand it resulted in an obvious disease picture in the field. In the Greeley district it was found on early planted and watered potatoes. The general and prevailing dryness and lack of irrigation water prevented the usual Rhizoctonia epidemic. (MacMillan)

Control:

It is gratifying to note that successful control with seed treatment is reported by many of the collaborators.

New York: Onondaga County - In many cases in field when untreated seed was planted, injury has been severe. (Ward, N. Y. State Coll. Agr. Depts. Pl. Path. & Ent. Weekly News Letter, July 27)

Maryland: The number of potato growers who treat their seed has been growing very rapidly during the past few years. This has resulted in a corresponding decrease in the amount of scab and Rhizoctonia. Bichloride of mercury is the most popular chemical used for treating seed potatoes. (Jehle & Temple)

South Carolina: Where seed treatment was practiced losses were light. (Moore)

Wisconsin: Corrosive sublimate and hot formaldehyde effective in control. (Vaughan)

Kansas: Eighty-eight per cent of plants affected in untreated fields and less than 20 per cent in treated fields. Hot formaldehyde gave better results than mercuric chloride. (White)

In Idaho (6) and Washington (4) wetting the tubers and keeping them moist 12 to 48 hours preceding seed treatment is recommended. It is claimed that by this means sclerotia on the surface are induced to germinate and made easier to kill by the treatment.

In New Zealand (2) the addition of concentrated hydrochloric acid to mercuric chloride solutions was found to kill all sclerotia. Treatments recommended are, - a five-minute immersion in 1 - 1250 mercuric chloride plus concentrated hydrochloric acid at the rate of one part in 50 parts of the mercuric chloride solution, and covering the tubers in piles over night; or a sixteen-hour immersion in 1 - 8000 mercuric chloride plus concentrated hydrochloric acid at the rate of one part to 1000 parts of the mercuric chloride solution.

Recent literature

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3. Dana, B. F. The Rhizoctonia disease of the potato. Washington Agr. Exp. Sta. Pop. Bul. 131: 5-30. 1925.

4. ________ The Rhizoctonia disease of potatoes. Washington Agr. Exp. Sta. Bul. (Techn. Paper) 191: 1-78. Aug. 1925.

5. Dorst, J. C. Vermeerdering van aardappel-Rhizoctonia in de natcelt door gebruik van stalmest. Tijdschr. Plantenz. 31: 115-118. May 1925.

6. Iddings, E. J. Treatments for control of Rhizoctonia. In Idaho Agr. Exp. Sta. Bul. 135 (Ann. Rept. Director 1924): 37. Jan. 1925.

7. Müller, K. O. Die Rhizoctoniakrankheit (Hypochnose) der Kartoffel und ihre Bekämpfung. Pflanzenbau 1924/25: 358-361. May 1, 1925.

8. Thomas, K. S. Onderzoeking over Rhizoctonia. Electr. Druk. 'De Industrie' J. van Druten, Utrecht, 98 pp. 1925.

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WILT CAUSED BY FUSARIUM SPP.

The only states reporting losses greater than one per cent. from the wilt caused by Fusarium oxysporum Schlecht. this year are New Mexico, Utah, California, Arizona, and North Dakota. The seed piece rot was very destructive in the Greeley district of Colorado, according to H. G. MacMillan, who stated that together with the extreme drought it caused the replanting of practically all of the early crop planted in April and May, and that seed piece rot and wilt also caused a general reduction in stand in the late crop, estimated, as a result of many field counts, at about 20 per cent.

Table 11. Percentage reduction in yield due to Fusarium wilt of potato, as estimated by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
4	New Mexico	0.5	Maryland, Indiana, Kentucky, Idaho, Texas, Ohio
3	Utah		
2	California, Arizona		
1.5	North Dakota	Trace	New York, Virginia, West Virginia, Georgia, Minnesota, Washington
1	South Carolina, Michigan, Alabama		

Wilt and stem-end rot caused by F. eumartii Carpenter was common and severe in Nebraska, according to Goss.

Recent literature

1. MacMillan, H. G., and G. A. Meckstroth. The critical temperature and infection of the potato seed piece by Fusarium oxysporum. Jour. Agr. Res. 31: 917-921. Nov. 15, 1925.

2. Small, W. Notes on species of Fusarium and Sclerotium in Uganda. Bul. Misc. Inform. Kew 1925: 118-126. 1925.

Species of Fusarium resembling _F. udum_ Butl. described from India and placed provisionally with that species; causes a potato rot, enters through wounds. This, and a species described as causing potato rot and wilt in India, very similar, both resemble _F. radicicola_ Woll.

BACTERIAL WILT CAUSED BY BACTERIUM SOLANACEARUM EFS.

The entire country seemed to be free from bacterial wilt, according to reports from collaborators. Maryland is the only state reporting any loss and there it was only a trace. The only other states reporting its occurrence were South Carolina and Georgia.

WART CAUSED BY SYNCHYTRIUM ENDOBIOTICUM (SCHILB.) PERC.

Pennsylvania: There have been no outstanding occurrences of potato wart in Pennsylvania this year. The quarantine methods were followed out in the usual way, and by the use of the Spaulding Rose, which must be universally planted, there appears to be no opportunity for any multiplication of the organism.

The present wart quarantine involves portions of 11 counties in which 813 gardens in 58 towns and villages have been known to be infested with the wart. In the area under quarantine, there are 134 farms, growing 141 5 acres of potatoes, and 14,803 gardens with a calculated area of 106.5 acres; or in all, the total area under potato production in the quarantined area is about 247 acres. In the Safety Zone surrounding the anthracite wart section, there are 1,356 planters, made up of 783 farms and 573 gardens. These are scattered in four counties. In 1925 the Safety Zone planted 42,841 bushels, of which 14,121 were of susceptible varieties (33.8%), and the remainder, 28,720, were immune (66.2%).

During 1925 a survey was made of towns and villages outside the present quarantined area to determine whether systematic inspection would disclose additional infections of wart. Parts of seven counties, including 56 towns, were thus covered. In these towns, 737 gardens growing potatoes were inspected, but no wart was found. It is interesting to note that 454 of these gardens were planted to susceptible varieties, and 283 to immunes. (McCubbin)

Maryland: The only new occurrence of wart reported in 1925 was one new infested garden found in the town of Lord which is within the present quarantined area. This brings the total number of infested gardens which have been found in Maryland to 20, located as follows: Dotmcla 3; Charlestown 1; Midland 1: Eckhart Mines 3; Mount Savage 4; Lord 7; Welsh Hill 1. Immune varieties are being planted in all infested gardens. (Jehle & Temple)

West Virginia: There have been no special new developments in connection with potato wart in West Virginia during the last season. Our quarantine was maintained as usual, but the inspection service did not report any new locations during 1925. (Giddings).

VIRUS DISEASES

Recent investigations have demonstrated that there are many different virus diseases, with varying symptoms that are influenced greatly by environmental factors, sometimes being masked in such a way that they become very difficult to recognize.

Johnson (6, 11) has reported three different types of symptoms which he calls "mottle", "spot necrosis", and "ring spot", resulting in tobacco plants inoculated with an extract from apparently healthy potato plants. He was able to transmit the "spot necrosis" type back to the potato, where it produced an especially malignant disease, although loss of virulence of the infective principle followed repeated transfers through this host.

Schultz (13) has described a necrosis, resembling the so-called "streak" of potato, which developed from cross-inoculations between apparently healthy potato plants of different varieties. No mottling such as was described by Johnson was observed, however. Since Green Mountain and other American varieties used in this investigation are susceptible to "streak", but were not affected by the necrosis described, it appears that the latter is not the same as streak, although very similar to it.

Recent literature

1. Folsom, D., and E. S. Schultz. Methods to be observed to prevent spread of virus diseases in potatoes grown for seed stock. Proc. Potato Assoc. Amer. 11 (1924): 20-26. 1925.

2. Goss, R. W. Two important groups of Nebraska potato diseases. I. Potato wilt and tuber rots. II. 'Run out' potatoes caused by degeneration diseases. Nebraska Agr. Col. Ext. Serv. Ext. Circ. 1256: 1-23. 1925.

3. Goss, R. W., and G. L. Peltier. Further studies on the effect of environment on potato degeneration diseases. Nebraska Agr. Exp. Sta. Res. Bul. 29: 1-32. 1925.

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6. Johnson, James. Transmission of viruses from apparently healthy potatoes. Wisconsin Agr. Exp. Sta. Res. Bul. 63: 1-12. 1925.

7. Murphy, P. A., and R. McKay. Investigations on the leafroll and mosaic diseases of the potato. Jour. Dept. Lands & Agr. Ireland 25: 138-154. Aug. 1925.

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11. Russell, H. L., F. B. Morrison, and W. H. Ebling. Apparently healthy plants produce mosaic disease. In New pages in farm progress. Wisconsin Agr. Exp. Sta. Bul. 373 (Ann. Rept. Director 1923/24): 5-8. April 1925.

12. Salaman, R. N. Degeneration of the potato. - An urgent problem. Jour. Nat. Inst. Agr. Bot. No. 3: 39-51. 1925.

13. Schultz, E. S. A potato necrosis resulting from cross-inoculation between apparently healthy plants. Science n.s. 62: 571-572. Dec. 18, 1925.

14. ----------- Why potatoes run out. U. S. Dept. Agr. Farmers' Bul. 1436: 1-19. 1925.

15. ----------- and D. Folsom. Infection and dissemination experiments with degeneration diseases of potatoes. Observations in 1923. Jour. Agr. Res. 30: 493-528. March 15, 1925.

MOSAIC (CAUSE UNDETERMINED)

Reports from the various states indicate that there were greater losses from mosaic than from any other potato disease in 1925.

Table 12. Estimated reduction in yield of potatoes due to mosaic as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
15	Arkansas, Louisiana	2	Iowa, Kansas, New Mexico
10	New Hampshire, Maryland, Washington	1	Virginia, Michigan, Minnesota, North Dakota
9	Utah	0.5	Delaware, Indiana
8.5	Idaho	0.25	Connecticut
8	Georgia	0.1	Texas.
5	North Carolina	Trace	West Virginia
4	South Dakota		
3	Ohio, Massachusetts		
2.5	Maine, New York, Alabama		

Arkansas, Louisiana, Maryland, New Hampshire, and Washington report the largest losses. In Maryland this was due mostly to the severity of mosaic in the native strains of the McCormick potato used extensively for late planting, but the disease was also very abundant on the Green Mountain, Gold Coin, and Rural varieties. In Wisconsin and Arkansas mosaic was reported to be very prevalent on Triumph, which is the variety mostly grown in the latter state.

The losses from mosaic and similar diseases would undoubtedly have been very much larger throughout the country had it not been for the improvement in quality and the increasing use of certified seed. This is especially noticeable in states where the growers have been taught to recognize these troubles by extension pathologists and other extension workers. During the potato tours which are organized annually in several states, growers observe diseases in the field and compare fields grown from the best and from inferior seed, with the result that there has been an increased demand for better seed. In 1925 Maryland, Louisiana, Alabama, Michigan, and Wisconsin, reported a reduction in losses from virus diseases due to this factor.

Olitsky and Northrop (3) report successful inoculation of "supposedly normal" tomato and tobacco plants with potato mosaic virus. They state:

> "We may conclude that the disease in potato plants can be transferred to tomatoes and tobacco from either the leaf or tuber. The signs in tomatoes and tobacco are identical, whether the inoculum is derived from plants which showed very marked mosaic or from those which exhibited signs so slight as to be dubious--a fact which should be borne in mind in the selection of mosaic-free plants, since potato plants are always propagated from tubers. Furthermore, the appearance of the experimental disease is identical with the natural affection in tomatoes and tobacco."

Reports of collaborators:

Delaware: Very common in home gardens where home seed selection is made. (Adams)

Maryland: Very serious on McCormicks. Many fields so badly diseased that they were not worth digging. (Jehle & Temple)

Kentucky: In Jefferson County a few fields were plowed up on account of degeneration troubles. (Valleau & Gardner)

Mississippi: Very few growers or seed dealers are using certified stock, as yet. (Neal)

Ohio: In fields from home grown seed, mosaic is quite evident. The mosaic that can be seen is of the severe rugose type. Seldom does a plant appear to have mild mosaic. Our temperature is such that the symptoms are masked. (Tilford, Aug. 1)

Wisconsin: Improvement is being secured by tuber indexing conducted by Experiment Station. (Vaughan)

Wyoming: Mild mosaic was present throughout the state in moderate amounts, mostly on seed potatoes or stock intended for seed. Extremely difficult of detection. Severe in some fields. (MacMillan)

Colorado: In the Carbondale district, the probable percentage of infection with mild mosaic varied from 5 to 100 per cent. In fields subjected to care, 15 to 20 per cent would be discovered. (MacMillan)

Oregon: Rugose mosaic spreads very rapidly. In 2-1/2 rows containing about 425 plants, 24 showing rugose mosaic were pulled out on June 18. Later in the season 60 plants showing current season symptoms were pulled out. Mild mosaic is not very important. (McKay)

California: The spring season was favorable for detection of mosaic and high percentages of mild and curly dwarf forms have been observed with serious reduction in yield. (Rosa)

Recent literature (See also references given under heading "Virus Diseases".):

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2. Iddings, E. J. Mosaic and leaf-roll of potatoes. In Idaho Agr. Exp. Sta. Bul. 135 (Ann. Rept. Director 1924): 35-36. Jan. 1925.

3. Olitsky, P. K., and J. H. Northrop. The inoculation of tomato and tobacco plants with potato mosaic virus. Science n. s. 61: 544-545. May 22, 1925.

4. Richards, B. L. Plant Pathology. In Utah Agr. Exp. Sta. Bul. 192 (Bienn. Rept. Director 1923/24): 58-61. 1925.

5. Russell, H. L., F. B. Morrison, and W. H. Ebling. Indexing potatoes to eliminate mosaic disease. In New pages in farm progress. Wisconsin Agr. Exp. Sta. Bul. 373 (Ann. Rept. Director 1923/24): 8-9. April 1925.

LEAFROLL (CAUSE UNDETERMINED)

Leafroll is present in practically all of the potato growing regions of the country. In 1925 most of the collaborators reported its prevalence as about the same as usual. The largest losses were reported from New Hampshire, New York, New Jersey, Ohio, Indiana, New Mexico, and California. In Kentucky, according to Valleau, leafroll and mosaic together caused a loss of 40 per cent.

Table 13. Estimated percentage reduction in yield of potatoes due to leafroll as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
6	California, New Jersey	1.5	Idaho
5	New Hampshire, Ohio	1	Maine, Michigan, Georgia
4	New York, Indiana, New Mexico	0.5	Delaware
3	Massachusetts	Trace	Virginia, West Virginia, Minnesota, Iowa, Kansas, Texas, North Dakota
2.5	South Dakota		
2	Maryland, Utah, Washington		

In Maryland a rolling of the leaves which was almost identical in appearance with that due to leafroll was found on practically all of the plants in certain fields. The presence of virus diseases in these fields could be detected only when their symptoms were extremely pronounced. This trouble was very severe in plots grown from certified seed on the Experiment Station grounds at College Park, affected plants being dwarfed and rosette-like, with decidedly curled leaves of only about half the normal size. This condition is believed to be due to lack of moisture resulting from the drought which prevailed during the summer. Evidently a similar condition existed in New Jersey, since W. H. Martin stated (July 18) that, "Leafroll has been particularly severe but an accurate diagnosis of the disease has been made impossible owing to the large amount of leaf rolling resulting from moisture deficiency", and further (final report), "High temperatures and low moisture resulted in severe leaf rolling which resembled leafroll. On advent of wet weather the trouble disappeared." Barrus (1) ascribed a similar leaf rolling in New York to weather conditions. McWhorter observed a malnutrition trouble simulating leafroll on acid soils in Virginia.

As with mosaic, the losses from leafroll are being reduced greatly in many states by the use of certified seed.

Collaborators' reports:

New York: Most common near the lakes and less pronounced on elevations. Some seed growers are spraying or dusting their seed beds each week with nicotine to control aphis and leaf hoppers with the hope of preventing the spread of virus diseases. (Chupp)

Arkansas: Typical leafroll symptoms practically unknown. Probably masked under Arkansas conditions. (Dept. Plant Path.)

Ohio: Very common except in fields from disease-free seed. (Tilford, Sept. 1)

Indiana: Most important disease of the late crop. Main reason for the use of certified seed in Rural varieties. (Gardner)

Michigan: Not important in certified fields. Disease is common in uncertified stock, some fields of which show as much as 25 per cent. (Kotila)

Colorado: This virus disease is one of the most conspicuous in the Carbondale section, in symptoms usually being confused with Rhizoctonia. On the Russet Burbank, leafroll is quite evident. (MacMillan)

Oregon: Occurs in eastern Oregon; very uncommon in western Oregon, where it has been found only in several very widely separated fields, affecting only one or two plants in a whole field. (McKay)

Recent literature (See also references given under heading "Virus Diseases"):

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2. Campbell, Elmer G. Potato leaf roll as affecting the carbohydrate, water, and nitrogen content of the host. Phytopath. 15: 427-430. 1925.

3. Iddings, E. J. See mosaic.

4. Richards, B. L. Plant pathology. In Utah Agr. Exp. Sta. Bul. 192 (Bienn. Rept. Director 1923/24): 58-61. 1925.

5. Whitehead, T. Some experiments on potato leaf-roll transmission in Wales. Welsh Jour. Agr. 1: 184-188. Jan. 1925.

SPINDLE TUBER (CAUSE UNDETERMINED)

This disease, which rather recently has been recognized to be infectious was reported in 1925 in the three additional states of Ohio,

Colorado, and California. Although it has been reported from the following states only, it probably occurs in the majority of states: Maine, Vermont, New York, New Jersey, Nebraska, Ohio, Florida, Michigan, Wisconsin, Washington, and California. In New York the reduction in yield from spindle tuber is estimated at 1 to 2 per cent of the crop and in Michigan as a trace.

Collaborators' reports:

New York: Quite common, especially on some strains. (Chupp)

New Jersey: Spindle tuber was commonly observed. Some lots of seed show as much as 30 per cent of this disease. (Martin)

Michigan: Disease observed in Irish Cobbler, Bliss Triumph, Early Ohio, Green Mountain, and Rural New Yorker varieties. (Kotila)

Nebraska: Spindle tuber again appears as the major disease in most sections. Only a small amount appears in certified fields but many commercial fields planted with common stock which had not been rogued or selected show very high amounts of spindle tuber. Some seed introduced from other states show over 50 per cent infection. (Goss)

Goss (4) has reported the results of some interesting experiments on transmission of spindle tuber, as follows:

"Successful inoculations for spindle-tuber transmission were made in the greenhouse in 1924 by rubbing together freshly cut surfaces of infected and healthy potatoes. In 1925, under field conditions, 40 inoculations were made by cutting healthy seed with a knife previously used to cut infected tubers, and a similar number were made by rubbing together the cut surfaces of healthy and infected seed pieces. Both the healthy checks and the inoculated seed pieces were from the same healthy tubers and were planted in adjoining rows.

"The contact inoculations resulted in 47.5 per cent infection, 45 per cent questionable infection and 7.5 per cent healthy as compared with 32.5 per cent, 47.5 per cent and 20 per cent respectively for the knife inoculations. In addition to the distinct symptoms on the tops and tubers, the yield also was reduced, the average of both sets of inoculations being 153 gm. per plant for the disease checks, 602 gm. for inoculated and infected plants, 962 gm. for those considered questionable infection, and 1154 gm. for healthy checks. Cutting knives and seed piece contact can transmit spindle-tuber, and they may prove to be sources of infection in the field."

Recent literature

1. Gilbert, A. H. Studies on spindle-tuber of the potato. Proc. Potato Assoc. Amer. 11 (1924): 101-102. 1925.

2. Gilbert, A. H. "Giant hill" potatoes a dangerous source of seed. A new phase of spindle-tuber. Vermont Agr. Exp. Sta. Bul. 245: 3-16. May 1925.

3. Goss, R. W. Effect of spindle tuber disease on sprouting. Potato News Bul. 2: 261-262, 264. 1925.

4. ----------- Transmission of potato spindle-tuber disease by cutting-knives and seed piece contact. (Abstract) Phytopath. 16: 68-69. Jan. 1926.

5. Werner, H. O. Relation of environment to spindle-tuber symptoms. Proc. Potato Assoc. Amer. 11 (1924): 102-106. 1925.

6. ------------ The spindle-tuber disease, one cause of "run out" seed potatoes. Nebraska Agr. Exp. Sta. Bul. 207: 1-21. 1925.

OTHER VIRUS DISEASES

WITCHES' BROOM (UNDET.) (3) was reported in 1925 from Idaho, Washington, and Oregon. Idaho, "Less than usual or than last year. Very important in some fields. Most common in northern part of the state, but found also in south" (Hungerford). Oregon, "Not very widespread; rather general in the Willamette Valley, with more in the lower part (Washington, Multnomah, and Clackamas Counties). Reduces yield to practically nothing in plants from diseased tubers. Generally occurs in only small percentages, but up to 30 per cent has been observed in some plantings. Only very occasionally is much present, however" (McKay).

GIANT HILL (UNDET.). Results of studies on giant hill are reported by A. H. Gilbert as follows (2):

> "As a result of field and greenhouse observations covering a period of two years, the following conclusions have been reached: Giant hill is a degeneration disease causing a certain set of symptoms in potato vines and resulting in the production of tubers of undesirable shapes for seed and market purposes. It is similar in its effects upon tuber shape to a recently described disease known as 'spindle-tuber'. The foliage symptoms, however, are distinct from those of spindle-tuber." (page 4)
>
> "The fact that giant hill tubers exhibit the same tendencies as to shape as have previously been demonstrated by means of rather numerous data for spindle-tuber, furnishes support for the conclusion that giant hill is a new phase of spindle-tuber or at least is somewhat closely related to it as indicated by its effects upon the potato plant." (page 10)

"YELLOW-TOP, UNDET. (DEGENERATION DISEASE). Trace in Maine, apparently introduced in certain Canadian stocks. Previously reported in certain old central Maine stocks." (Folsom)

Recent literature (See also references given under heading "Virus diseases"):

1. Atanasoff, D. New studies on stipple-streak of potatoes. Phytopath. 15: 170-177. 1925.

2. Gilbert, A. H. "Giant hill" potatoes a dangerous source of seed. A new phase of spindle-tuber. Vermont Agr. Exp. Sta. Bul. 245: 3-16. May 1925.

3. Iddings, E. J. See mosaic.

YELLOW DWARF (CAUSE UNDETERMINED)

Yellow dwarf was reported to be much less prevalent than last year in New York. Chupp states that, "For some unknown reason, there was little or no yellow dwarf even in fields where it occurred abundantly each year since 1917. The only possible explanation is that the weather was not favorable for its development."

TIPBURN AND HOPPERBURN

In 1925 the largest losses from tipburn and hopperburn were reported from West Virginia, New York, and Arkansas. Other states reporting greater losses than during the average years are New Hampshire, New Jersey, Wisconsin, and New Mexico.

Table 14. Percentage losses from tipburn and hopperburn of potato as estimated by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
17	West Virginia	2	New Hampshire, South Carolina
10	New York, Arkansas	1	Maryland, Michigan, Texas
6	South Dakota	1.5	Arizona
5	Virginia, Georgia, New Jersey	0.25	Connecticut
4	New Mexico	Trace	Kentucky, Kansas, Utah, Idaho
3	North Carolina		

Collaborators in Maryland, Ohio, and New Mexico reported satisfactory control from spraying with Bordeaux mixture.

Reports of collaborators:

New York: Tipburn and hopperburn very serious. Much less on potatoes planted after the first week in June and also on potatoes grown at higher altitudes; almost none above 1500 feet. (Chupp)

West Virginia: Hopperburn very important; general and severe even in the most elevated sections of the state. Most severe on early potatoes. Unusually dry and hot during June and July. Leaf hoppers very numerous. (Sherwood & Giddings)

Georgia (southern): Tipburn caused severe injury on Bliss during May; most prominent on poor quality seed. Common all over the Coastal Plain, but most severe in the northern part where it was hotter and drier. (Boyd)

Arkansas: Tipburn, not associated with leaf hopper, very prevalent, more than average. Extreme dry weather through potato growing season appears certainly to be connected with it. Late potatoes were a complete loss in many cases. (Dept. Plant. Path.)

Wisconsin: Hopperburn statewide, a major leaf trouble, more this year. Worse on potatoes planted early. In general, injury most severe on early varieties. (Vaughan)

OTHER DISEASES AND INJURIES

Armillaria mellea (Vahl) Quel., mushroom root rot. Oregon, Washington County, not important. McKay reports, "A few tubers are found every year. The highest amount ever reported was 3 per cent of the tubers in a field located in an old prune orchard. It always occurs either on old prune orchard land where root rot had been present, or on land cleared from timber, especially oak."

Colletotrichum atramentarium (Berk. & Br.) Taub., anthracnose, black dot, stem canker (5, 6, 9). New York, observed occasionally in Wyoming and Allegany Counties; Virginia, specimen sent in from Norfolk County by McWhorter.

Heterodera radicicola (Greef) Muell., rootknot. Losses from rootknot reported were, - California 5 per cent, Georgia (southern) 3 per cent, Texas, one-half per cent. Georgia, "Destructive in a few gardens, common in some field plantings. Causes stunting of plant, undersized, pimply, and knobby tubers, easily invaded by other organisms. Common in the Coastal Plain." (Boyd). Oregon, "This trouble is not known to be established and causing damage in any field, although several authentic cases of its occurrence at various times are known. ~~In 1925 it was reported by E. R. Jackman of Oregon Agricultural College as occurring in one lot of potatoes observed in Benton County, not severe."~~ (McKay). California, "Occurs in all potato regions." (Milbrath).

Phoma tuberosa Melhus, Rosenbaum, & Schultz, tuber rot. Specimens determined by Freeman Weiss, sent in from Pennsylvania in April yielded this fungus, Fusarium spp., Alternaria, and Clonostachys. The Alternaria was obtained from lesions with unbroken skin. The tubers were seed stock.

Pythium debaryanum Hesse, leak. Idaho, "Always important in midseason crop when not handled properly; more reports this year than in previous years." (Hungerford). Washington, "A number of cases on potatoes in storage." (Dept. Plant Path.). California, "Stockton Delta region, three-tenths per cent loss." (Milbrath).

Rhizopus sp., leak. Washington.

Sclerotium rolfsii Sacc., stem rot, Southern blight, caused losses of one-half per cent in Georgia and in Texas, and was reported also from Florida and Mississippi.

Spondylocladium atrovirens Harz, silver scurf. New York (trace), Virginia, Idaho, Washington.

Verticillium alboatrum Reinke & Berth., wilt. New York, "Present, but not distinguished from Fusarium wilt" (Chupp). Virginia, "A large percentage, as judged by cultures made in several localities, of the potato wilt prevalent in local plantings of northern grown seed is due to Verticillium" (McWhorter, Truck (Norfolk) Exp. Sta.). Also reported from Oregon.

Bacterial tuber rot. Connecticut, "Bacillus carotovorus Jones. One report of seed rotting in field somewhat, one of rot following blight; also found on Connecticut potatoes in transit" (Clinton). New York, "1 - Bacillus carotovorus ? A soft colorless rot was found in a few fields before late blight was present. 2 - A firm brown rot resembling but different from late blight rot, cause unknown, probably bacterial, caused considerable loss. Probably bacterial soft rot following late blight rot, according to Barrus. Late rains favored the disease greatly." (Chupp)

Marginal burning, leafspot, and leaf drop, cause unknown. Oregon, "Burning of the edge of leaf in spots coalescing around the margin, followed by spotting of the entire leaf, and finally by dropping of the lower leaves, was rather general in western Oregon and of considerable importance in individual hills, causing losses of 30 per cent in some hills. Sometimes one plant in a hill would be affected and the others free. According to E. R. Jackman of Oregon Agricultural College Extension there was less wherever there was sufficient potash." (McKay)

Calico (undet.). Nebraska, "A few scattered plants resembling Hungerford's description of calico have been found in occasional fields." (Goss). Idaho, "More reported than usual" (Hungerford). Oregon, "Calico has occurred in eastern Oregon for several years, in noticeable although only small percentages. It was never seen in western Oregon until 1924, when two or three plants in an experimental plot in Multnomah County, planted with seed from Malheur County (eastern Oregon), showed calico." (McKay).

Weather injuries. Drought (see also under leafroll) caused considerable loss in a number of states, including New Jersey, Maryland, West Virginia, and Idaho. Frost injury (7) was reported from Wisconsin and Washington. Oedema due to excessive moisture occurred in Washington. Lightning injury was reported from New York.

Streak (cause unknown), found in occasional fields, mostly on Long Island, although some in up-state fields, in New York. Caused a trace of loss. (Chupp)

Heat necrosis and net necrosis each caused a loss of one-half per cent in California, according to Milbrath. Black heart was reported from New York (trace to one per cent loss), Wisconsin, and Washington. Internal browning (1), California and Washington. Hollow heart (8), Washington. Scald of two types, one occurring in the ground before digging, and another caused by tubers lying on the ground too long after digging and picking, reported from the Hastings section of Florida by E. J. Conklin, Jr., (U. S. Dept. Agr. Bur. Agr. Econ. Fruit and Veg. Div. Letter 6: 210-211. May 8, 1925). Jelly-end rot, (undet.), Idaho and California. Physiological wilt, Virginia.

Recent literature:

1. Anon. Internal brown fleck in potatoes. Jour. Dept. Agr. South

Africa 10: 292-294. April 1925.
Application of lime some months before planting seems to control disease.

2. Appleman, C. O., and W. D. Kimbrough. Physiological shrinkage of potatoes. Proc. Potato Assoc. Amer. 11 (1924): 66-67. 1925.

3. Barrus, M. F. An account of seed troubles in some parts of New York during the past month. Potato News Bul. 2: 315-316. 1925.

4. Buckhurst, A. S. Notes upon bulb mites and eelworms. Jour. Min. Agr. Great Britain 32: 734-738. Nov. 1925.
Stem eelworm (Tylenchus dipsaci) attacking tubers, and beet eelworm (Heterodera schachtii) attacking small roots and rootlets but not tubers. (See also reference 11).

5. Dickson, B. T. Colletotrichum v. Vermicularia. Mycologia 17: 213-217. Sept.-Oct. 1925.

6. ------------- Taxonomic studies of the organism causing black-dot disease of potato. (Abstract). Phytopath. 15: 300. May 1925.

7. Eastham, J. W. Vascular discoloration in tubers from vines killed by frost. Potato News Bul. 2: 108. March 1925.

8. Hardenburg, E. V. Hollow heart in potatoes. Potato News Bul. 2: 155-159. 1925.

9. Scott, G. A. Cultural characteristics of certain Colletotrichum species. Ann. Rept. Quebec Soc. Prot. Plants 16: 123-137. 1925.

10. Stapp, G. Der "Bakterienkrebs" der Kartoffeln. Arb. Biol. Reichsanst. Land.- u. Forstw. 13: 413-418. Feb. 1925.
Account of successful inoculation of sound tubers with Bacterium tumefaciens, forming tumors. Not likely to have any importance.

11. Strachan, J., and T. H. Taylor. Potato eelworm. Jour. Min. Agr. Great Britain 32: 941-947. Jan. 1926.
Eelworm similar to if not identical with Heterodera schachtii, known as beet eelworm on the Continent, but in England as potato eelworm since attack is mostly on potatoes. Attacks roots mostly but may also affect tubers at times. Of considerable importance. (See also reference 4)

12. Wright, R. C. Low temperature injury to potatoes in storage. Proc. Potato Assoc. Amer. 11 (1924): 54-59. 1925.

LEAFSPOT CAUSED BY SEPTORIA LYCOPERSICI SPEG.

The greatest losses in yield reported in 1925 were from Kentucky, Maryland, Delaware, Arkansas, and Indiana. In most cases leafspot was said to be less prevalent than usual or than last year. New Mexico and Texas were the only western states reporting losses.

Table 15. Estimated average percentage loss from and relative prevalence of leafspot in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year	State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year
Ky.	20	More	More	Va.	2	Less	--
Del.	15	Less	Less	Ala.	2	Less	Less
Md.	15	Same	Same	Texas	1	--	--
Ark.	10	More	More	Ohio	0.5	Less	Same
Ind.	10	More	More	N. Y.	Trace	--	--
Iowa	8	Less	--	N. C.	Trace	--	--
Wis.	5	Less	Less	S. C.	Trace	--	--
Mich.	4	Less	Less	Ga.	Trace	Less	Less
N. Mex.	4	Same	Same	Minn.	Trace	Same	Same
Kans.	3.5	More	More	S. Dak.	Trace	--	--
N. J.	3	Less	Less	Conn.	-	Same	Less
W. Va.	3	Less	Less				

Table 16. Dates and places of first appearance of leafspot as reported by collaborators, 1925.

Date	State	Place	Date	State	Place
July 14	Ohio	Tipton Co.	Aug. 1	Wisconsin	Madison
July 21	Delaware	Dover	Aug. 11	Connecticut	Cheshire
July 25	New York	Tompkins Co.			

Collaborators' reports

New Jersey: This disease was observed on the Earliana tomatoes early in June, but was checked during the drought which lasted throughout most of the summer. The disease was also observed in September and October on late crop tomatoes, but in most cases the fruit was mature before defoliation occurred and heavy losses did not occur. (Poole)

Virginia: Present in only a few localities. Except in Richmond region, only a few infected plants observed. (McWhorter)

West Virginia: Leafspot generally present, but extensive damage only local. (Sherwood)

Kentucky: Leafspot was severe during the drought period but the plants made late growth in the fall and recovered to a great extent. (Gardner)

North Carolina: Present, but did little damage. (Lehman)

Florida: Collected only on the west coast where it caused considerable damage to certain fields; not generally distributed. (Weber)

Mississippi: Very small amount. Damage less than 1 per cent. (Beal)

Arkansas: Heavier defoliation than previously noted. Crop cut down seriously. (Dept. Plant Path.)

Indiana: Low temperatures of July and August retarded crop and gave the disease a chance to reduce leaf surface. Hot September resulted in sunscald of fruit on defoliated vines. (Gardner)

Michigan: Heavy rains in September and October responsible for late development and reduction in yield of late crop. Spraying not generally practiced. (Nelson)

Missouri: Observed by E. M. Page in many fields in south and southwest Missouri. Damage generally slight. Good control where tomatoes were sprayed. (Maneval)

Recent literature

Pritchard, Fred J. Tomato blight. Canning Trade 49 (14): 12, 14, 16, 18-20. Nov. 23, 1925.

FUSARIUM WILT CAUSED BY FUSARIUM LYCOPERSICI SACC.

Fusarium wilt was reported from all parts of the country but the greatest losses apparently occurred in the southeastern and south central states. In several states injury to plants in the greenhouse as well as in the field is reported.

Table 17. Dates and places of first appearance of Fusarium wilt as reported by collaborators, 1925.

Date	State	Place	Date	State	Place
May 26	New York	Monroe Co.	July 14	Indiana	Howard Co.
June 13	Kansas	Manhattan	July 18	Virginia	State Colony
June 15	Georgia	Thomas Co.	July 21	Delaware	Dover
July 10	South Carolina	Calhoun	Aug. 5	Wisconsin	Milwaukee

Table 18. Estimated average percentage loss from and relative prevalence of Fusarium wilt in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year	State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year
La.	15	Same	Same	Fla.	3	--	--
Ark.	15	--	--	Texas	3	--	--
Ala.	12	More	More	Utah	3	Same	More
N. J.	10	More	--	N. Y.	1	--	--
Ill.	10	--	--	Ind.	0.2	Same	Less
Kans.	10	Same	Same	Del.	Trace	Less	Less
Md.	7	More	More	W. Va.	Trace	Same	Same
N. C.	6	Same	Same	Mich.	Trace	More	Same
Ohio	6	Less	Less	Wis.	Trace	--	--
S. C.	5	Same	Same	N. Dak.	Trace	Same	Same
Ga.	5	Less	Less	S. Dak.	Trace	--	--
Ky.	4	Same	Same	Wash.	Trace	--	--
Va.	3	More	--				

Collaborators' reports

New Jersey: This disease was more severe than any of the past few years. It occurred in many fields, where isolated spots frequently showed 100 per cent loss. In some instances the plants were killed before the first set was mature, but frequently the plants were not killed until some fully ripened tomatoes were produced. The losses were greatest in Gloucester County where the Earliana and Acme varieties are grown on the sandy soils. The canhouse crop, being grown on heavy soil types, has never been severely affected. (Poole)

Virginia: More prevalent and destructive than in average season. The hot dry weather has favored its development. (Fromme)

Kentucky: Growers of canning tomatoes, if they raise their own plants, seem to have little difficulty with wilt, but where plants are supplied from a central point there appears to be more trouble. (Gardner & Valleau)

South Carolina: Present, apparently about as usual. (Ludwig)

Georgia (southern): Less prevalent than in 1924, although few small commercial fields showed from 1 to 10 per cent. Most common in gardens. Showing worse on second planting than in first. Estimated loss to early crop 2 per cent. (Boyd, July 15)

Florida: Wilt was common in many fields during the past season, generally over the state, probably second in importance to nailhead. (Weber)

Mississippi: Serious where wilt-resistant varieties are not used. (Neal)

Drought injury together with wilt heavy. Ten per cent loss. (Beal)

Texas: Generally prevalent throughout east Texas. More conspicuous due to dry season. (Taubenhaus)

Oklahoma: This organism is more or less plentiful in nearly all sections of the state, and in some it is practically impossible to grow the standard varieties. (Rolfs)

Arkansas: Important. Appeared early in southern and central Arkansas. Many home gardens of tomatoes are a complete failure. Canning crop is late and not as much reported as usual. (V. H. Young, Aug. 1)

Ohio: This disease caused considerable loss in greenhouses this season and especially in those greenhouses that were not thoroughly steamed. The loss outside seems to be less than common. (H. C. Young)

Loss below normal in northern section of the state but very severe in the southern part. (Thomas)

Indiana: Occurred to some extent in southern grown plants throughout the state but cool July and August checked its severity. (Gardner)

Michigan: Confined to local areas in southernmost counties and occurs mostly on light soils. Not important commercially except in greenhouses. (Nelson)

Wisconsin: Rare; seen in a few gardens near Milwaukee. (Vaughan)

Utah: Very important in Davis and Weber counties. Complete failure of crop in certain fields. (Richards)

In Missouri (9) experiments for the control of wilt were conducted by attempting to change the hydrogen-ion concentration of the soil by using lime, rendering the soil unsuitable to the growth of Fusarium lycopersici. Tomato plants of a susceptible variety were set in the treated soil but marked wilting was noted after thirty days. Soil samples taken three inches below the surface showed pH values practically identical with untreated soil.

Pritchard (5) states that wilt is disseminated chiefly through seed and plants. He says that tomato seed produced on wilt infested soil is quite commonly infected by the wilt fungus (Fusarium lycopersici) and that this often happens in wilt-resistant varieties.

The most satisfactory method for the control of Fusarium wilt is the use of resistant varieties. Fortunately a number of such varieties have been developed by different workers. Pritchard (5) reports the development of three promising new wilt-resistant varieties, the Marvana, Marvelosa, and Marglobe. Favorable results from the use of wilt-resistant varieties are reported from California (2), Missouri (6), and Utah (7).

Statements from collaborators concerning the use of resistant varieties are as follows:

North Carolina: Marvel and Norton varieties proved effective in controlling this disease. (Fant)

Alabama: Wilt resistant varieties satisfactory and these are being grown some by truckers and gardeners. (Blair & Miles)

Mississippi: Serious on susceptible varieties. Norton proving popular and resistant. (Beal)

Louisiana: More general use of resistant varieties is decreasing the loss. (Tims)

Arkansas: Resistant varieties successful where used. (Dept. Plant Path.)

Kansas: Louisiana Red, Louisiana Pink, Kanora, recommended as giving good results. Marvana also. (White)

California: Wilt begins to show up in most sections of the state but the losses from this disease have not yet been serious this summer. It may partly be due to the fact that many growers are now using Norton variety when the infection of the soil with tomato wilt Fusarium is suspected. (Shapovalov, July 30)

Recent literature:

1. Edgerton, C. W., and E. C. Tims. Department of plant pathology. Louisiana Agr. Exp. Sta. Ann. Rept. 1924: 31-32. 1925.

2. Lesley, J. W., and Michael Shapovalov. Dodging wilt with resistant tomatoes. Pacific Rural Press 109: 39. 1925.

3. Norton, J. B. S. Some interesting work on tomato seed breeding and selection. Seed World 17: 12. 1925.

4. Pollock, N. A. R. Tomato wilt and resistant varieties. Queensland Agr. Jour. 23: 188-190. March 1925.

5. Pritchard, F. J. Tomato wilt and varietal resistance. Seed World 17: 7-9. 1925.

6. Quinn, J. T. Tomato seed selection for disease resistance. In Mumford, F. B. New knowledge. Missouri Agr. Exp. Sta. Bul. 228 (Ann. Rept. Director 1923/24): 59-60. Jan. 1925.

7. Richards, B. L. Plant pathology. In Utah Agr. Exp. Sta. Bul. 192 (Bienn. Rept. Director 1923/24): 58-61. 1925.

8. Robb, O. J. ~~Hothouse~~ tomato growing. Canadian Hort. 48: 72-76. 1925.

9. Robbins, W. J., and Irl T. Scott. A study of certain fusarial diseases of plants.--Tomato Fusarium wilt. In Mumford, F. B. New knowledge. Missouri Agr. Exp. Sta. Bul. 228 (Ann. Rept. Director 1923/24): 42. Jan. 1925.

EARLY BLIGHT CAUSED BY ALTERNARIA SOLANI (ELL. & MART.) JONES & GROUT AND NAILHEAD SPOT CAUSED BY MACROSPORIUM TOMATO CKE.

Three distinct types of injury are reported under this heading, the leafspot and fruit rot, the nailhead spot, and the collar rot. The largest losses from early blight reported are from Florida and Louisiana.

Table 19. Estimated reduction in yield of tomatoes due to early blight and nailhead spot, 1925.

Percentage: loss	States reporting	Percentage: loss	States reporting
15	Florida	Trace	New Hampshire, New Jersey,
10	Louisiana		Maryland, Kentucky,
5	Virginia, Georgia		North Carolina, South
3	New York		Carolina, Arkansas,
1.5	Michigan		Wisconsin, Minnesota,
1	Maine, West Virginia,		Iowa, North Dakota,
	Texas		South Dakota, Nebraska,
0.5	Delaware, Alabama		Kansas, California

Leaf blight and fruit rot

The leaf blight form of the disease seemed to have caused larger losses than the fruit spot. In Virginia, Fromme reports it to have been an important cause of fruit drop. He says it persisted during the dry weather and was a more common cause of leaf blight than Septoria. In southern Georgia, Boyd reports early blight injury to have resulted mostly from defoliation, nailhead spot having been less important. In Indiana it was reported to be very serious locally. Michigan reported fruit rot destructive in local areas.

Nailhead spot

This fruit spot which seems to be limited to the southern states was reported to cause serious injury to tomatoes in 1925. Weber says:

> "This was by far the worst disease on the host plant in Florida, considering the damage done. It was severe in all sections of the state causing more loss on the east coast sections than elsewhere. Its severity was about the same as previous seasons there, while on the west coast the losses were less than the year before."

It was also reported from Georgia and Alabama.

Collar rot - See collar rot due to various organisms. (Page 39.)

Recent literature

Pritchard, Fred J. Tomato blight. Canning Trade 49 (14): 12, 14, 16, 18-20. Nov. 23, 1925.

YELLOW BLIGHT (CAUSE UNDETERMINED)

Yellow blight continues to be the most important tomato disease of the West, although Utah, Idaho, and Washington report less than last year. On the contrary, California and Oregon report it to be worse than last year and worse than average. In California the reduction in yield for the state was estimated at 25 per cent, in Idaho at 8 per cent, and in Washington at a trace.

Oregon: Very important in some localities. Chief limiting factor in tomato production. (McKay)

California: An unusually early and very severe attack of this disease has occurred, first appearances being noted at Modesto on May 20; at Lodi, June 1; at Davis, June 2; and near Davis, May 25. The earlier plantings were affected to a greater degree. The percentage of affected plants increased steadily through the month of June. Loss about 60 per cent on 20,000 acres. (Rosa)

There is another severe outbreak of western tomato blight in California. This year, however, the epidemic extends over a much greater area than it did last year. By the first week in July only 5 to 10 per cent of the plants remained in the majority of fields in the Sacramento and the Modesto sections and even less in Kern County. The conditions near Merced at that time appeared somewhat better and in a number of fields 40 to 50 per cent of the crop was still unaffected. The amount of blight in the Santa Clara Valley, south of San Jose and in the nearby sections, was not in excess of 20 per cent, and it was practically absent on the peninsula north of Santa Clara. In the vicinity of Riverside the disease has developed to date (July 30) to the extent of about 30 percent, but it is quite negligible in the coastal sections of Los Angeles and Orange Counties. The early part of the season this year was unusually cool, and this condition was apparently responsible for the extremely injurious effect of a hot and dry spell that followed. (Shapovalov, July 30)

Shapovalov (2) has published data which show a striking correlation between the rate of evaporation and the incidence of yellow blight. He states that, "Conditions which favor high rate of evaporation also favor severe outbreaks of this blight." It was shown by detailed weekly observations at Riverside and Shafter, California, that severe attacks of the disease were both preceded and accompanied by high evaporation. It is also significant that blighted plants which were not in the last stage of the disease tended to recover partially, very seldom completely, when the evaporation dropped to a low level for a time.

Recent literature:

1. Richards, B. L. l. c., see Fusarium.

2. Shapovalov, Michael. High evaporation: a precursor and a concomitant of western yellow tomato blight. Phytopath. 15: 470-478. Aug. 1925.

3. ------------- Ecological aspects of a pathological problem (western yellow blight of tomatoes). Ecology 6: 241-259. 1925.

MOSAIC, CAUSE UNDETERMINED

Although the amount of mosaic has been increasing during the past few years, most collaborators report less than in 1924.

Table 20. Estimated losses from mosaic as reported by collaborators in 1925.

Percentage: loss	States reporting	Percentage: loss	States reporting
8	Ohio	1.5	Utah
6	New York	1	Maryland, Kansas
5	Minnesota, New Mexico	0.5	Indiana
2.5	Michigan	Trace	Virginia, Wisconsin
2	California, Iowa		

Collaborators' reports:

Connecticut: One report of considerable injury. (Clinton)

New Jersey: The filiform, streak, and mosaic effects were observed in many fields this year. The disease was very severe in some fields and heavy losses occurred. In one field of Greater Baltimore tomatoes that showed 100 per cent infection in June, close observation was made until the plants were completely defoliated in October. Although severely diseased throughout the growing season, the average production per acre on six acres was between 10 and 14 tons of nearly all first class fruit. This is the only case of this kind reported from this state. (Poole)

Maryland: Very prevalent in some fields, seems to be increasing in severity in the state. (Jehle & Temple)

Virginia: Typical mosaic was common in the Virginia tomato sections during the past season. (McWhorter)

Kentucky: Very slight mosaic this year. (Gardner & Valleau)

Florida: The disease was very severe on the west coast, showing up in 100 per cent of the fields in that section. The early crop suffered little loss but late plantings in several instances were total losses. The fruit that set was malformed. (Weber)

Oklahoma: Causing considerable loss in the west central portion of the state. Fully 20 per cent of the plants in a small field were killed by this disease. (Rolfs)

Ohio: Mosaic has not been as serious this year as last although it has caused some loss in some sections. Less serious in trucking section than last year but somewhat more general in greenhouses. (H. C. Young)

Michigan: Mosaic was destructive in some greenhouses, but out-of-doors was not a factor in production this year. Apparently less than the usual amount in commercial fields. (Nelson)

Wisconsin: Found a few plants in greenhouses at Milwaukee. (Vaughan)

Minnesota: Generally present in usual abundance. (Sect. Plant Path.)

Nebraska: Mosaic very common, varying from a trace to 90 per cent in commercial fields. This is the most serious disease of tomato vines in this state. (Goss)

Kansas: Worst in the western Arkansas Valley around Dodge and Garden City. Causes failure to set. (White)

Utah: Tomato mosaic is found to be especially severe in Davis County. A number of fields show heavy infestation, in some cases up to as much as 75 or 80 per cent. Exact distribution and severity for other parts of the state is at present unknown. (Richards)

Oregon: Apparently this disease is widespread and probably doing some damage. (Barss)

More serious and more abundant in greenhouses here, although occasionally serious in individual fields, as much as 5 to 10 per cent. Some growers believe infection comes from potato plants which were near beds where tomato plants were started. (McKay)

California: Very severe attack of "shoe-string" mosaic noted at Milipitas in October. Few scattering plants elsewhere. (Rosa)

Elmer (3) reports successful inoculation of tomato by transmission by various methods of mosaic virus from bean, celery, sugar cane, Cucurbita pepo, Zinnia elegans, Calendula officinalis, Abutilon theophrasti, Martynia louisiana, Asclepias syriaca, Nepeta cataria, and Nicotiana glutinosa; and infection of Cucurbita pepo by tomato mosaic virus. The symptoms produced on tomato by inoculation from these various hosts were similar to those produced by tomato or tobacco mosaic virus.

Olitsky and Northrop (7) report infection of tomato plants with virus from mosaic potatoes, both tubers and leaves producing a disease identical in appearance with tomato mosaic.

Recent literature:

1. Anon. Virus diseases of plants. Aphides and the tomato and potato mosaics. Fruit Grow. 59: 233-234. Feb. 12, 1925.

2. Dickson, B. T. Tobacco and tomato mosaic. Science n. s. 62: 398. Oct. 30, 1925.
(2) Streak of tomato in Quebec a "double-virus" disease.

3. Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 39-91. 1925.

4. Gardner, M. W. Necrosis, hyperplasia, and adhesions in mosaic tomato fruits. Jour. Agr. Res. 30: 871-888. May 1, 1925.

5. Hansen, A. A. Controlling diseases by destroying weeds. Better Crops 44: 22-23, 28-29. June 1925.
Eradication of ground cherry and bull nettle to control tomato mosaic.

6. Olitsky, P. Experiments on the cultivation of the active agent of mosaic disease in tobacco and tomato plants. Jour. Exper. Med. 41: 129-136. 1925.

7. ------------ and J. H. Northrop. The inoculation of tomato and tobacco plants with potato mosaic virus. Science n. s. 61: 544-545. May 22, 1925.

8. Pritchard, Fred J. Tomato blight. Canning Trade 49(14): 12, 14, 16, 18-20. Nov. 23, 1925.

9. Richards, B. L. l. c. see Fusarium.

10. Schenk, P. J. De mosaiekziekte van de tomaat. Floralia 46: 118. Feb. 20, 1925.

11. Sorokin, Helen. The destruction of the chloroplasts in tomato mosaic. (Abstract) Phytopath. 16: 66-67. Jan. 1926.

STREAK OR WINTER BLIGHT (CAUSE UNDETERMINED)

In New York loss from streak in greenhouses in 1925 is estimated at 2 to 5 per cent.

New York: Important in many greenhouses, general. Monroe County - Lord Robert variety severely affected. Growers cut off affected tops. Some evidence that it spreads along the row. Chemung County - Considerable number of plants affected. (Chupp)

New Jersey: See mosaic.

Ohio: The streak disease of tomato is becoming more conspicuous each season, being found not only in greenhouse culture, but also in field tomatoes. In many cases this seems to be associated with mosaic symptoms. Decided stunting of the plants and reduction in yield are the most marked symptoms where the disease occurs. (Dept. Plant Path.)

Streak is now regarded, by some investigators in this country and in Canada, as a virus disease. Gardner (3), who has described abnormalities of the fruit produced by plants affected with streak, considers it to be an extremely severe form of mosaic. Dickson (2) calls it a "double-virus disease." He states that from the results of experiments and from observation, ". . . . it may reasonably be concluded that in Quebec streak or stripe of tomato is not a disease caused by B. lathyri but is a disease resulting from double inoculation, i. e., with virus of potato mosaic and tomato mosaic (tobacco mosaic in this case being considered the same as tomato mosaic)."

On the other hand, Stone (4) believes that the disease, as observed in the greenhouse in Ontario, is associated with excess of nitrogen and deficiency of potash and of phosphoric acid in the soil, and states that, "Good results in the control of this disease in commercial greenhouses have been obtained by increasing phosphoric acid and potash content of fertilizers applied under cultivation." However, Bewley (1) apparently attaches no importance to phosphate but lays stress upon the use of potash or the proper balance of nitrogen and potash. He believes that the disease is caused by Bacillus lathyri Manns & Taub.

Recent literature:

1. Bewley, W. Tomato diseases. Jour. Royal Hort. Soc. 47: 169-174. Sept. 1922.

2. Dickson, B. T. Tobacco and tomato mosaic. Science n. s. 62: 398. Oct. 30, 1925.

3. Gardner, M. W. Necrosis, hyperplasia, and adhesions in mosaic tomato fruits. Jour. Agr. Res. 30: 871-888. May 1, 1925.

4. Stone, R. E. Winter blight or streak in tomatoes. (Abstract) Phytopath. 15: 300. May 1925.

COLLAR ROT DUE TO VARIOUS ORGANISMS

Collar rot due to various organisms, mostly undetermined in the particular instances reported, was severe locally in New Jersey, Maryland, Virginia, North Carolina, Mississippi, and Indiana.

New Jersey: This disease was reported in May and June from plant beds in Camden, Burlington, Salem, and Cumberland Counties. It caused a girdling and blackening of the underground stem and dark spots on parts of the stem above ground. The disease was transmitted to the field from the plant beds, and in four

fields the losses of plants were 10, 30, 20, and 10 per cent respectively. (Poole)

Maryland: Some collar rot on tomatoes on Eastern Shore. Less than last year. (Jehle, Aug. 3)

Virginia: Very abundant in early spring crop. (McWhorter, Norfolk (Truck) Exp. Sta.)

Alternaria is blamed for much of the stem canker which is prevalent in some fields. (Fromme, Sept. 15)

North Carolina: Reported by Moore as occurring and causing severe injury in one or two places at Maxton, N. C., as a result of seed bed infection. (Ludwig, Sept. 15)

Mississippi: This disease is quite common throughout this section (Raymond, Hinds County), and in some fields will cause a loss of 20 to 25 per cent. (H. H. Wedgworth, letter July 23, transmitting specimen which could not be determined.)

BACTERIAL WILT CAUSED BY BACTERIUM SOLANACEARUM EFS.

As usual this disease is reported only from the southern states. This is a disease which is usually only serious locally. The largest losses are reported from South Carolina and Louisiana.

Table 21. Estimated losses from bacterial wilt as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	South Carolina	1	Georgia, Florida
5	Louisiana	0.5	Maryland, Alabama
3	North Carolina	Trace	Virginia
2	Mississippi		

Collaborators' reports:

North Carolina: Localized, but often producing serious damage in garden plots. (Fant)

South Carolina: Common throughout coastal section. Some fields infected as high as 15 per cent. First noticed in Charleston County, May 13. (Moore)

Florida: Disease generally distributed and as severe as last season, especially on sandy soil in the central portion of the state. (Weber)

Mississippi: Reported in June from Wayne County, where it was

causing serious damage locally. Also appeared to be very prevalent in Copiah County about the middle of June. (Neal)

Porto Rico: Common and severe. (Cook & Tucker)

BACTERIAL CANKER (GRAND RAPIDS DISEASE) CAUSED BY APLANOBACTER MICHIGANENSE EFS.

This disease was not reported from any new states in 1925, but its appearance in British Columbia was recorded (2). Five reports of this trouble were received in Connecticut in 1925, all rather serious and it was so bad in two fields that growers plowed them up, according to Clinton. In Massachusetts it was said to be serious in greenhouses. In New York, Chupp reports one field badly affected with a disease having symptoms of the Grand Rapids disease, and a bacterium was found to be present. Anderson (1) reports that a number of tomato growers in southern Illinois who secured plants from Georgia were troubled with the Grand Rapids disease. In his opinion the disease was evidently introduced on the imported plants, since in several fields as high as 10 per cent of the Georgia plants were affected, while home-grown plants nearby showed no indication. No direct reports of the presence of the Grand Rapids disease in Georgia have been received by the Plant Disease Survey office. This emphasizes the necessity for a more careful survey of southern states for the presence of this disease which is not well known and is sometimes confused with other tomato wilts.

The symptoms of the Grand Rapids disease are well described by Miss Bryan (Pl. Dis. Rep. 8: June 15, 1924) as follows:

> "This disease is characterized in early stages by a one-sided wilting of leaves, leaflets on one side being perfectly turgid while those on the other are flaccid or even dried up. Later, pale streaks may appear along the line of infection on stems, which often crack open along this line. The interior of the stem in early stages shows whitish spots in the region of the vascular ring, but in later stages there is a yellow or yellow-brown discoloration, not so dark as with Bacterium solanacearum. Often the whole pith and cortex is involved with distinct cavities, especially on the upper tender parts. In the more advanced stages the whole plant is wilted. It is a much slower acting disease than the wilt caused by Bacterium solanacearum."

Recent literature:

1. Anderson, H. W. A serious bacterial disease of tomatoes in southern Illinois. Ill. State Hort. Soc. News Letter 6: Aug. 10, 1925.

2. McLarity, H. R., and T. M. C. Taylor. A bacterial disease of tomatoes new to British Columbia. (Abstract) Phytopath. 15: 302. May 1925.

BACTERIAL SPOT CAUSED BY BACTERIUM VESICATORIUM DOIDGE
(Bacterium exitiosum Gardner & Kendrick)

In previous years bacterial spot has been reported from Pennsylvania, Tennessee, Georgia, Florida, Indiana, Illinois, Michigan, Iowa, and Kansas. The disease was recorded from several new states in 1925, including New York (verified by Gardner), Kentucky, Louisiana, Nebraska, and Missouri. In most of these it was found in only one field, but in Nebraska, according to Goss, it was common and severe and caused considerable loss.

Since 1922, when it was first described, bacterial spot has been reported each year as causing more damage than previously in Indiana, and 1925 was no exception to this rule. Gardner stated that, "Owing to spring freezes more southern grown plants than usual were used in Indiana this year and to this is attributed the increased prevalence of this disease." On the other hand, Nelson reported that in Michigan, "Bacterial spot was not noted this year. It never has assumed commercial importance in the state, usually being found only locally", and White reported it as of very slight importance, as usual, in Kansas.

Since many tomato plants are now being grown in the South for use in northern states it would be desirable to know what and how serious the diseases are that are occurring in the southern plant beds.

NEW BACTERIAL DISEASES

Two new bacterial diseases have been reported during 1925.

A bacterial rot of tomato fruits, occurring in Nebraska and Texas, is described by Miss Brown (1). The organism causing it has not yet been named.

A bacterial vascular wilt, due to an organism which, according to Dr. Erwin F. Smith's office in the Bureau of Plant Industry, is unlike any hitherto associated with a tomato disease, was reported from Oregon by Barss, as follows:

> "A bacterial systemic vascular wilt of tomato has appeared with severe effects in a few gardens and one truck farm near Corvallis. So far the trouble is all traceable to one lot of seedling tomatoes but further study of distribution and occurrence is needed. The bacteria are actively motile, which excludes *Aplanobacter michiganense*. *Bacillus solanacearum* is not supposed to be present in the arid or semi-arid Northwest. Nothing like this has been seen in Oregon before as far as we know."

Recent literature:

1. Brown, Nellie A. A new bacterial disease of tomato fruits. Science n. s. 62: 12-13. July 3, 1925.

BLOSSOM-END ROT, NON-PARASITIC

In states where tomatoes were planted early, and fruited before the drought was broken by fall rains, blossom-end rot was reported to be more severe than usual, whereas, in states where tomatoes were planted later, and fruited after the drought had been broken, blossom-end rot was less severe, or at least no worse, than usual.

Table 22. Estimated average percentage loss from and relative prevalence of blossom-end rot in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year	State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year
Ga.	10	More	Same	Calif.	1	--	--
Ark.	10	More	More	N. Dak.	0.5	Less	Less
N. C.	8	More	Same	Mich.	Trace	Less	Same
Va.	4	More	More	Wis.	Trace	Less	Less
N. Mex.	4	More	More	Minn.	Trace	Less	Less
Md.	3	Less	Same	Iowa	Trace	Less	--
W. Va.	2	More	More	Mass.	-	Same	Same
N. Y.	1.5	--	--	La.	-	Same	Same
Ala.	1.5	More	More	Ohio	-	Same	Same
Texas	1	--	--	S. Dak.	-	Same	--
Kans.	1	Same	Same	Utah	-	Same	--
Ariz.	1	--	--	Oregon	-	More	--

Collaborators' reports:

New Jersey: This disease was just as severe as usual in greenhouses and caused much loss in isolated areas. (Poole)

Virginia: Blossom-end rot followed by a large-spored Macrosporium was the most severe fruit trouble during the summer. In a few places it ruined the early crop. (McWhorter)

More general and severe than I have ever seen it, 50 to 60 percent of affected fruits not uncommon. Aside from this and Fusarium wilt the tomato crop is exceptionally free from disease. (Fromme)

Georgia (southern): A high percentage (probably 15 per cent) of first settings affected due to rainy weather following the protracted drought of April and May. Subsequent settings of fruit practically free. (Boyd)

Alabama: Blossom-end rot of tomato is the worst in this section that many growers have ever experienced. This disease, together with the ravages of the tomato fruit worm, Heliothis obsoleta, has seriously reduced yields. The season has also been abnormally dry. It is a common observation that blossom-end rot is much

more serious on fields which are not watered than on irrigated fields. (N. F. Howard)

Quite severe in experimental plots on College Farm. Increase was due, no doubt, to the severe, dry weather during the summer. (Miles & Blain)

Mississippi: Prevalent and serious everywhere this season because of dry weather. (Neal)

Texas: Very prevalent in east Texas, 3 per cent loss. (Taubenhaus)

Arkansas: All over state. Dry weather appears to have had serious effect. (Dept. Plant Path.)

Indiana: Rather serious. Occurs on first fruit set. More serious in gardens and greenhouses than in the canning crop. (Gardner)

Michigan: Tomatoes were planted very late and the drought was broken by the time commercial set of fruit was in susceptible condition. (Nelson)

Idaho: Very important. Usually associated with lack of water. (Hungerford)

Oregon: Very abundant this year due to excessively hot and dry atmospheric conditions prevailing early and later in the season. (Barss)

ROOTKNOT CAUSED BY HETERODERA RADICICOLA (GREEF) MUELL. (Caconema radicicola (Greef) Cobb)

The rootknot disease of tomatoes was reported to be severe in 1925 in southern Georgia, Florida, Arkansas, and in southern California and the San Joaquin Valley. In south Georgia the estimated loss in yield is 8 per cent, in California 5 per cent, and in New Mexico 3 per cent. Other states reporting rootknot outside of greenhouses are Maryland, South Carolina, Texas, Oklahoma, and Kansas. In Virginia, Ohio, South Carolina, and Maryland it was reported in greenhouses.

Tomato survey for rootknot in Maryland - R. A. Jehle and C. E. Temple.

Tomato plants from the South have been brought into Maryland for a number of years, but they have only been introduced in very large numbers during the past two years. In the spring of 1925 several million plants were shipped in, most of them coming from Georgia. Tomato growers had been warned by the pathologists of the state that they were taking a great risk of infecting their land with nematodes and other disease producing organisms when they brought in those plants. In order to ascertain whether nematodes were actually being brought in with the imported plants a thorough survey was made in the three Eastern Shore counties, Dorchester, Caroline, and Talbot, into which most of the plants were brought. The first search for rootknot was made immediately before picking season and a severely infested

field set from Georgia plants was found. Further inspections were made about mid-picking season but no new cases were found. The most complete survey was made at the end of the picking season, when large numbers of plants could be pulled up and examined without causing losses to the growers. This inspection was made thoroughly, at least a hundred plants being pulled up in each field, and often as many as five hundred. Sixteen fields set from Georgia plants and eleven set from home-grown plants were inspected. The most important result of this survey was the finding of rootknot in every field set from Georgia plants, and in a few fields of home-grown plants which had been associated with or grown adjacent to Georgia plants. The amount of rootknot found varied from a trace to 100 per cent infected plants but the loss in yield was slight in most cases. However, in one field the disease was so severe that the loss was estimated by the owner as 50 per cent of the crop. Rootknot has been found before in the state on several other crops but has been relatively unimportant in the field heretofore.

Table 23. Results of survey for rootknot of tomatoes in Maryland, 1925.

County	Number of farms surveyed	Approximate number of plants examined: Georgia-grown: Total	Free	Infected	Home-grown: Total	Free	Infected
Caroline	8	847	770	77	455	349	6
Dorchester	8	991	428	563	270	268	2
Talbot	3	327	201	126	156	156	0
Total	19[1]	2165	1399	766	881	773	8[2]

1. Home-grown and Georgia-grown were both inspected on nine farms. Home-grown only on two farms, and Georgia-grown only on seven farms.

2. All may have been infected from Georgia plants through puddling with or growing adjacent to, Georgia plants.

LEAFMOLD CAUSED BY CLADOSPORIUM FULVUM CKE.

In 1925 leafmold was reported to be the cause of serious injury to tomatoes in the greenhouse in Massachusetts, New York (estimated reduction in yield 10 per cent), Ohio, Indiana, and Washington. It was also reported to be present although not serious, in greenhouses in Michigan and Wisconsin. McWhorter states that in Virginia some field plantings were seriously injured by leafmold, Bonny Best being very susceptible. In Florida, according to Weber, it was most severe on the west coast, being about the same as last year.

Gardner, in a recent article (1), described a "conspicuous, black, stem-end rot of both immature and ripe greenhouse tomatoes" occurring in epiphytotic form in a fall crop of Bonny Best tomatoes at Lafayette, Indiana, in 1923, and found to be due to Cladosporium fulvum, which "also causes blackened radial furrows in the fruit, and lopsided fruits which tend to remain

green or yellow on the retarded side." Infection occurs apparently "rather early through stomata in the sepals, torus, or last pedicel internode, after which the mycelium grows down into the fruit." The fungus also "invades the seed both externally and internally", and cotyledon infection of germinating seedlings may occur from both infected and surface-contaminated seed. The temperature range for growth and spore germination of the fungus was found to be from 10° to 30°, and the optimum at 20° to 25° C.

Recent literature:

1. Gardner, Max W. Cladosporium leaf mold of tomato: fruit invasion and seed transmission. Jour. Agr. Res. 31: 519-540. Sept. 15, 1925.

2. Hasper, E. Biologie und Bekämpfung des Cladosporium fulvum Cooke auf Solanum lycopersicum. (Biology and control of Cladosporium fulvum Cke. on Solanum lycopersicum.) Zeitschr. Pflanzenkrankh. 35: 112-118. 1925.

ANTHRACNOSE CAUSED BY COLLETOTRICHUM PHOMOIDES (SACC.) CHEST.

The following reports of anthracnose were received in 1925:

New York: One farmer sends specimens and says that nearly the whole crop was lost because of this disease. (Chupp)

New Jersey: This disease was much less severe than usual. In September and October slight losses occurred in the canhouse crop in Burlington County. (Poole)

Florida: Commonly found causing fruit rot. (Weber)

Indiana: Caused considerable loss to canners, one of whom found it responsible for an objectionable increase in mold counts in the pulp. (Gardner)

FRUIT ROT AND DAMPING-OFF CAUSED BY CORTICIUM VAGUM BERK. & CURT.

Total destruction of plants in a hotbed at Phillipsburg, Kansas, due to damping-off caused by Rhizoctonia, was reported by White. Rhizoctonia caused damping-off in Connecticut and New York, also. Bisby reported from Manitoba that some young plants were killed by Rhizoctonia dry stem rot.

Soil rot was reported from Texas and Indiana. It was worse than usual in central Indiana, according to Gardner, who stated that it was serious locally and was apparently most severe in soil where tomatoes had been grown during the previous year. It develops into a core rot which is very objectionable to the canners. The white Corticium stage appeared on the surface of the fruit.

DISEASES CAUSED BY PHYTOPHTHORA SPP.

Buckeye rot caused by Phytophthora terrestris Sherb. was common but not so important as in 1924 in Florida on tomatoes that were not staked, according to Weber. Norton reported it from Maryland as severe in one field near Washington. Gardner stated that it was noted in Indiana in market gardens in the vicinity of Indianapolis.

Canker caused by "Reddick's Phytophthora" was reported from New York by Chupp as "still present in the University greenhouses and a few neighboring gardens."

Leonian (1) includes both P. terrestris and "Reddick's Phytophthora", as well as several other species, in P. omnivora D By.

Recent literature:

1. Leonian, Leon H. Physiological studies on the genus Phytophthora. West Virginia Agr. Exp. Sta. Sci. Paper 11. Reprinted from Amer. Jour. Bot. 12: 444-498. July 1925.

2. Tryon, H. Tomato blight disease (Phytophthora infestans). Queensland Agr. Jour. 24: 239-242. Sept. 1925.

OTHER DISEASES

Verticillium alboatrum Reinke & Berth. Verticillium wilt was reported by Milbrath to be present in all parts of California, causing a loss estimated at one-half per cent. An occasional infection occurred in Ohio, according to Young.

Miss Bryan (1) found that Verticillium wilt occurred to a considerable extent in 1924 in tomato fields in northern Ohio and in Erie County, Pennsylvania, in combination with both Fusarium wilt and Grand Rapids disease. She states that "The demonstration of Verticillium wilt where Fusarium was supposed to be causing the trouble suggests that perhaps this fungus is doing damage in other places in northern tomato fields where cool temperatures would favor its ravages and retard Fusarium."

Pythium sp. causing damping-off was reported by Fenner to cause slight losses in Beaufort and Oconee Counties, South Carolina.

Damping-off caused by various organisms was important in New York, according to Chupp, who stated that, "If Rhizoctonia was not present, very good results were obtained with copper applied to the soil."

Sclerotium rolfsii Sacc. causing stem rot was of minor importance in southern Georgia, although it was common in the Coastal Plain. It caused a loss estimated by Boyd at 2 per cent. In two fields it was very common and destructive following rootknot injury. The fungus also caused a fruit rot in southern Georgia, which was not important. In South Carolina the stem rot was said by Fenner to be a limiting factor in the coastal area in some cases. Moore reported that "This trouble was found in 75 per cent of the fields of Beaufort County this season. Infection ran from a trace to as high as 25 per cent. Most cases seem to be soil infections, the stems rotting off at the ground line about the time of maturity of the first crop of fruit." (July 15). The disease was reported from Mississippi also.

Oospora lactis parasitica Pritchard & Porto, fruit rot. Destructive in some sections of Burlington County, New Jersey, where severe hail injury occurred during the summer, according to Poole.

Phoma destructiva Plow., fruit rot. Weber reported from Florida, "Fruit rot caused by this fungus was very important in transit. There was very little evidence of such damage in the field. It also caused a serious leafspot which was more common than last year." The disease was present in New York also.

Rhizopus nigricans Ehr. Milbrath reported that fruit rot due to Rhizopus caused a loss estimated by him at one-half per cent, in field and transit, in California.

Sclerotinia sclerotiorum (Lib.) Mass., watery rot (4). Reported by Weber to be serious where it occurred, but not common, in Florida.

Blossom drop, cause unknown. Collaborators in Texas and Kansas estimated the loss in yield due to blossom drop at one per cent, and the trouble was reported from Washington also. White states that in Kansas,

> "Blossom drop of tomatoes was severe this season on our experimental plots at Manhattan on plants staked and pruned to a single stem. It is of interest to note that a high percentage of those blossoms in bloom during an unprecedented period of cool weather, the last of July and the first of August, (coldest night July 31, 49° F.) all dropped. No difference could be noted between the many varieties and hybrids which were being grown. All seemed very susceptible to the sudden drop in temperature."

A die back or tip blight, the cause of which has not yet been determined, was observed by Shapovalov in tomato fields in the trucking sections of Los Angeles County, north of San Pedro, California. He says that some patches were totally ruined and were plowed up.

Hollow stem, due to excess of nitrogenous fertilizers, or to mixed fertilizers placed directly in contact with the roots, was reported from Arkansas.

Leafroll was reported by Weber to be important on staked tomatoes on the west coast of Florida.

Puffiness of the fruit (non-par.) caused losses estimated at one-half per cent in Texas and 2 per cent in California.

Wilting due to proximity to walnut trees was reported from Michigan by Nelson. Massey (3) describes a similar wilt of tomatoes and other plants, observed in Virginia, and concludes that it is due to a substance found in the bark of the walnut roots which is toxic to the plants affected.

Recent literature:

1. Bryan, Mary K. Verticillium wilt of tomato. Phytopath. 15: 187-188. March 1925.

2. Butcher, R. W. A bacterial rot of the tomato stem. Ann. Rept. Exp. & Res. Sta. Nursery & Mark. Gard. Devel. Soc. 10: 73-74. 1925.
   Rotting at base of stem due to Bacillus carotovorus.

3. Massey, A. B. Antagonism of the walnut (Juglans nigra L. and J. cinerea L.) in certain plant associations. Phytopath. 15: 773-784. Dec. 1925.

4. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

DISEASES OF SWEET POTATO

STEMROT CAUSED BY FUSARIUM BATATATIS WOLL. AND F. HYPEROXYSPORUM WOLL.

In the majority of the sweet potato growing states stemrot was reported to be more prevalent than usual in 1925.

Table 24. Relative prevalence of and estimated percentage loss due to stemrot in 1925.

State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year	State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year
N. J.	30	More	More	Calif.	2	--	--
Del.	10	More	More	N. C.	1	--	--
Iowa	10	Less	--	Ind.	1	--	--
Va.	5	--	--	Ariz.	0.5	--	--
Md.	4	Same	Same	S. C.	Trace	More	More
Ala.	3	Same	Same	La.	Trace	--	--
Ga.	2	More	--	Ky.	Trace	--	--
Ark.	2	More	More	Fla.		Less	--
Kans.	2	Less	Less				

The severity of stemrot in certain states can be judged from the following reports from collaborators:

New Jersey: The loss from stemrot this year was the greatest that has occurred in this state during the past five years. The large percentage of infection occurred early in July during an extremely hot drouth period. (Poole)

Delaware: Very heavy infection this season. The initial stand out 5 to 20 per cent in some fields. Weather very favorable for wilt during June and July. (Adams)

Virginia: The most severe infections noted for several years. In some cases 30 per cent of the crop destroyed. The disease was of greatest economic importance this season. (McWhorter)

Alabama: Quite important. General in coast counties and scattered throughout rest of state. Inspection by State Department of Agriculture is slowly lessening the disease. (Miles & Blain)

Arkansas: Common, especially in southern and central part of state, and causing much damage in some localities. (V. H. Young)

Indiana: This is the only serious field disease of this crop in the state. (Gardner & Kendrick)

The following statements were made concerning varietal susceptibility:

New Jersey: The Red Brazil, Yellow Yam and White Yam varieties, which in other years had not been attacked by the disease, were very slightly infected this year. (Poole)

North Carolina: Fant reports that a field of Nancy Hall sweet potatoes near Henderson were infected to the extent of about 50 per cent.

Georgia: Common in Porto Rico, Nancy Hall, and Big Stem Jersey. (Boyd)

Arkansas: Nancy Hall very susceptible, Porto Rico less than Nancy Hall. (Dept. Plant Path.)

Collaborators in Mississippi and Kansas report that the losses from stemrot are gradually being reduced by the use of certified or hill selected seed combined with rotation and seed bed sanitation. Poole (3) reports satisfactory control of stemrot in infested soil by planting two or three plants per hill instead of only one. He states that an almost perfect stand was maintained on soils where 50 per cent of single plants in check plots were killed and that the yield was increased even when plots containing single plants per hill were only slightly affected. This method is said to be less expensive than replanting.

Recent literature:

1. Poole, R. F. Sweet potato varieties that produce well and are resistant to stem rot on sassafras sands. Phytopath. 15. 48. 1925.

2. ----------- Fertilizer injuries to sweet potatoes. Some substances aid the destructive stemrot organism. New Jersey Agr. 7 (9): 7-8. Sept. 1925.

3. ----------- Making sweet potato growing safer. Ravages of stem rot reduced by simple method. New Jersey Agr. 7 (12): 2-3. Dec. 1925.

BLACKROT CAUSED BY CERATOSTOMELLA FIMBRIATA (ELL. & HALS.) ELLIOTT
(SPHAERONEMA FIMBRIATUM (ELL. & HALS.) SACC.)

Sweet potato blackrot seems to be decreasing in severity due to more

general employment of control measures such as the use of certified seed and sprouts, seed treatment, seed selection, and seed bed sanitation. The effect of the application of these practices upon the prevalence of blackrot in the various states is indicated by the following statements from collaborators and the accompanying table (table 25) and graph (figure 1).

Table 25. Percentage reduction in yield due to blackrot for the years 1919 to 1925.

State	Percentage reduction in yield						
	1919	1920	1921	1922	1923	1924	1925
New Jersey	15	16	2	2	2	0.2	0.2
Delaware	6	6	1	0.5	0.5	0.5	0.5
Maryland	5	5	1	1	1	1	2
Virginia	5	2	5	5	3	3	1
North Carolina	10	10	6	--	3	3	2
South Carolina	7	--	0.5	0.5	5	0.5	2
Georgia	12	5	7	2	1	2	1
Florida	2	--	--	--	Trace	--	Trace
Ohio	2	--	--	--	--	--	--
Indiana	Trace	Trace	1	Trace	1	--	Trace
Illinois	2	1	--	--	0.5	--	--
Iowa	2	--	5	5	9	9	5
Missouri	1	--	--	--	Trace	--	--
Kansas	8	5	3	2	1.5	0.5	0.5
Kentucky	--	--	--	15	15	--	5
Tennessee	10	10	8	10	3	8	--
Alabama	1	5	--	--	2	1	3.5
Mississippi	5	10	15	5	2	2	2
Louisiana	1	4	3	1	1	1	1
Texas	2	5	5	3	10	8	5
Oklahoma	2	2	--	--	--	5	4
Arkansas	1	2	5	1	2	5	4
New Mexico	5	--	--	--	2	--	Trace
Arizona	--	--	--	Trace	--	1	2
California	2	2	--	--	--	--	2
United States	5.64	5.4	5.4	3.4	3.2	2.75	1.8

New Jersey: This disease is nearly under control in this state. The selection of disease-free seed and the use of sanitary plant beds have completely eliminated the disease in many cases. In spite of the use of healthy seed stock, there is sometimes slight infection from some soils. The disease is also sometimes found in storage bins and several severe losses were reported. The use of the bushel hamper has done much to confine this disease to

individual baskets, thereby protecting much of the crop that would have been affected had the potatoes been stored in bins. (Poole)

Mississippi: Becoming less serious as a result of the work of the State Plant Board in inspecting all slips entering the state, and the destruction of all infected lots. Many growers of certified slips are also helping to reduce the disease. (Beal)

Arkansas: Seed certification helping to reduce losses materially. (Dept. Plant Path.)

Kansas: Seed treatment, hill selection for seed, and sanitary storage and bedding have about eliminated this disease. (White)

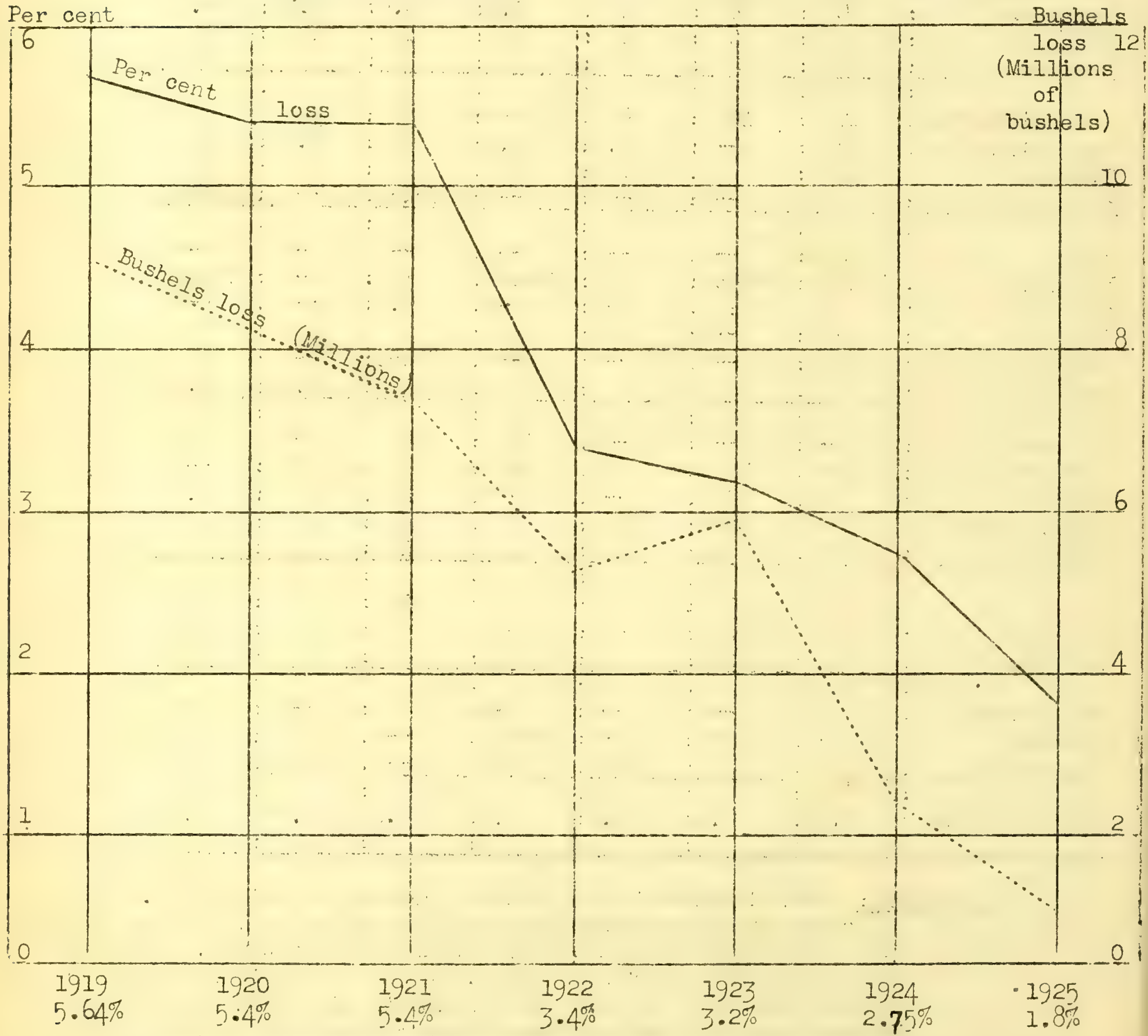

Figure 1. Graph showing decrease in loss from blackrot for the years 1919 to 1925 inclusive.

Recent literature:

1. Elliott, John A. A cytological study of Ceratostomella fimbriata (E. & H.) Elliott. Phytopath. 15: 417-422. July 1925.

SOIL ROT CAUSED BY CYSTOSPORA BATATA (ELL. & HALS.) ELLIOTT

The most severe injury from soil rot in 1925 was reported by Poole in New Jersey where the loss was estimated at 5 per cent. He states that

> "This disease was more severe than during the previous five years. It occurred on 80 per cent of the farms this year in comparison with only 10 per cent last year. Some of the oldest growers claim that it had not been seen on their farms previous to this season. In many fields the infection was so slight as to be negligible, while in others the crop was a complete failure. On soils where alfalfa was used in rotation and the soil heavily limed, the losses were extremely heavy."

A 2 per cent loss was reported from Arkansas; one per cent from Delaware; one-half per cent from Maryland; and a trace from Virginia, Kansas, Mississippi, Georgia, Louisiana, Oklahoma, and California.

Manns and Adams (1) have continued their investigations on the cause of soil rot. They found that by using bacteriological methods of staining, a fungus having morphological characters similar to Actinomyces, was consistently found in all pox lesions. This substantiates their conclusion that the disease is probably not due to Cystospora batata but rather to an undetermined Actinomycete.

Recent literature:

1. Manns, T. F., and J. F. Adams. Report of department of plant pathology and soil bacteriology. Delaware Agr. Exp Sta. Bul. 139: 24-29. 1925.

2. Poole, R. F. The relation of soil moisture to the pox or ground rot disease of sweet potatoes. Phytopath. 15: 287-293. 1925.

SCURF CAUSED BY MONILOCHAETES INFUSCANS ELL. & HALS.

Scurf does not affect the quality of the sweet potato unless it is attacked severely, when shrinkage may result. However, its presence impairs the appearance of the potatoes greatly. The losses from this disease depend largely upon market conditions, scurfy potatoes being discriminated against more severely when the supply is large than when it is small. Streets estimate the loss in Arizona at 2 per cent; otherwise only slight losses occurred in 1925, Maryland and South Carolina each reporting one-half per cent and New Jersey, Georgia, Florida, Arkansas, Indiana, and Kansas a trace.

New Jersey: The disease was present in many fields this year, but the percentage of infection was much less than during any of the preceding years. In many fields the stem of the plant was infected without the potatoes becoming infected. Recent results with disinfectants indicate that one should not rely upon seed treatment to destroy the fungus on infected potatoes, but should select for seed purposes only healthy stock. (Poole)

Recent literature:

1. Poole, R. F. Sulfur effective on scurf. New Jersey Agr. 7(4): 4. April 1925.

2. ------------- Soil stain of sweet potatoes. Care in harvesting reduces losses. New Jersey Agr. 7 (10): 11. Oct. 1925.

STORAGE ROTS

Rhizopus nigricans Ehr. is the most common and destructive cause of storage rot, but other organisms such as Diplodia tubericola (Ell. & Ev.) Taub. (Java black rot), Fusarium oxysporum Schl. (surface rot), and Ceratostomella fimbriata (Ell. & Hals.) Elliott (blackrot) are also responsible for much loss. (See also under other diseases).

Table 26. Losses from sweet potato storage rots in 1925, as estimated by collaborators.

Percentage loss	States reporting	Percentage loss	States reporting
30	Kentucky	8	Maryland, Florida
15	Georgia, Arkansas	6	North Carolina
11	Mississippi	5	Virginia, Iowa, Alabama
10	South Carolina, Texas, Arizona	3	Kansas
		Trace	California

Since a large part of the sweet potato crop is placed in storage each year after harvest, the prevention of storage rots is a very important problem. Formerly most of the crop was stored out-of-doors in banks. A few growers were very successful with this method and seldom lost much of the stored crop, but in most cases it proved to be a very hazardous practice and often many, and sometimes all, of the potatoes stored in banks were lost. This fact led to increased use of storage houses. Although decay was at first not very well controlled even in the houses, losses there were not so large as in banks. Investigation by federal and state plant pathologists and horticulturists of the problems of construction and management of storage houses and of the proper handling of the crop prior to storage led to improvements in methods which were demonstrated to the growers by federal and state extension workers and other agencies, especially during the war period and since, and which have resulted throughout the country in a great

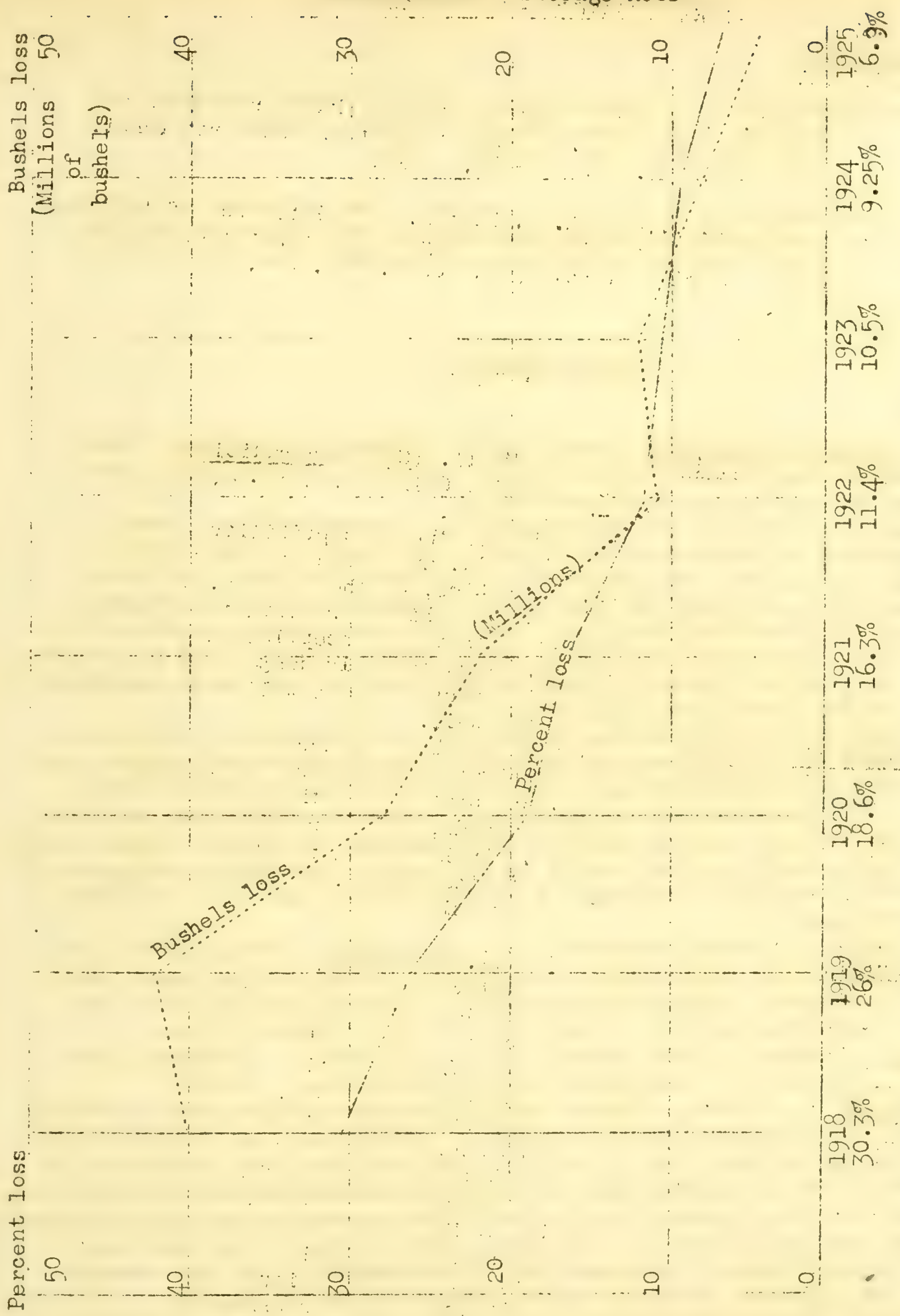

Figure 2. Graph showing losses from sweet potato storage rots in the United States from 1918 to 1925 inclusive.

decrease in the losses from sweet potato storage rots. This reduction is very well illustrated by the accompanying graph (figure 2), which shows the estimated losses from storage rots in the United States during the past eight years.

Recent literature:

1. Harter, L. L. A physiological study of Mucor racemosus and Diplodia tubericola, two sweet potato storage rot fungi. Jour. Agr. Res. 30: 961-969. 1925.

2. Lauritzen, J. I., and L. L. Harter. The influence of temperature on the infection and decay of sweet potatoes by different species of Rhizopus. Jour. Agr. Res. 30: 793-810. 1925.

OTHER DISEASES

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb) rootknot, was reported from Georgia, Oklahoma, and Arkansas, said to be often serious in the last-named state.

Weimer and Harter (7) investigated the susceptibility of sweet potato varieties to nematode in California, and found that Red Jersey, Little Stem and Big Stem Jerseys, Porto Rico, Southern Queen, and Yellow Belmont varieties, although not immune, are highly resistant to attack, whereas Nancy Hall and Red Brazil are both very susceptible and should not be planted on nematode-infested soil, since there is danger both of not obtaining a crop and of increasing soil infestation, as well as of carrying nematodes on the plants into uninfested soil.

Sclerotium rolfsii Sacc., southern blight, according to Boyd, was very important in many manured and irrigated beds in southern Georgia. He estimated the loss at one per cent, and stated that the greatest injury occurred in low damp beds or irrigated beds, and where artificial heat was supplied either from steam or manure. In Louisiana the disease caused a rotting of the plants in the beds early in the season, according to Edgerton. Young stated it was reported twice as causing serious damage in localized areas in Arkansas.

Pythium sp., mottle-necrosis (1). New Jersey, "This disease was observed again in the same areas as last year. It was not so severe as in 1924, but losses were observed in many fields, and in low flat areas the infection ranged from none to 30 per cent of the potatoes" (Poole). Mississippi, "Reported from Lowndes and Jones Counties. Diagnosis confirmed by L. L. Harter. Loss severe in both instances." (Neal)

Mosaic (? - Undet.) Losses reported as due to mosaic were one-tenth per cent in Arkansas and a trace in Kansas. The disease was reported from southern Georgia by Boyd, who stated that this was the first appearance in that section. Nancy Hall was the only variety observed affected in Arkansas, and seemed to be most susceptible in New Mexico, according to collaborators.

Two papers presented at the Kansas City meeting of the American Phytopathological Society discussed the transmissibility and true mosaic nature of this disease, with widely differing conclusions (4, 6).

Albugo ipomoeae-panduranae (Schw.) Sw., white rust, was reported from New Jersey, Delaware, Maryland, Virginia, Illinois, and Porto Rico. In New Jersey, according to Poole, "The disease was worse on the Jersey strains than on the so-called Yam sweet potato varieties in a field where varieties are being compared. Most of the so-called Yam varieties were not attacked."

Septoria bataticola Taub., leafspot. New Jersey, Delaware, Virginia, Kansas; not important although common in some cases.

Phyllosticta batatas (Thüm.) Cke., leafspot, reported from southern Georgia, Florida, and Louisiana.

Cercospora sp., leafspot. Porto Rico.

Ozonium omnivorum Shear (Hydnum omnivorum Shear), rootrot. Losses reported as due to the Ozonium rootrot were 3 per cent in Arizona and 2 per cent in Texas. The disease also caused considerable injury on the sandy land in the southern part of Oklahoma, according to Rolfs.

Corticium vagum Berk. & Curt., stem rot. Georgia, unimportant.

Macrosporium sp., footrot. Taubenhaus (5) reports a new footrot of sweet potato, which he states he has found in Delaware and in Texas.

Plenodomus destruens Harter, footrot. Maryland, Tennessee, South Carolina, Kansas.

Sclerotinia minor Jagger, reported by Poole to have caused slight damping-off of sprouts in one bed near Vineland, New Jersey.

Rhizopus spp., rot, reported from Delaware, Virginia, South Carolina, Florida, Indiana, Texas, Iowa, New Mexico, and Washington. Traces were observed in the field in Indiana, according to Kendrick. (See also storage rots)

Diaporthe batatatis (Ell. & Hals.) Harter & Fields, dry rot. Boyd reported from southern Georgia, "Of very little importance except in a few plant beds, caused a loss estimated at one-half per cent. Mostly draw stem rot, but also caused lesions on runners, and storage rot. Most destructive in hotbeds irrigated frequently. Big Stem Jersey apparently most susceptible in beds, field, and storage."

Sclerotium bataticola Taub., charcoal rot. Texas, Kansas; of slight importance in both cases.

Diplodia tubericola (Ell. & Ev.) Taub., Java black rot, was reported from South Carolina, Florida, and Porto Rico. In Florida it was said by Weber to be common and destructive. (See also storage rots).

Bacterial softrot, following heavy rain and excessive steam heat under beds, was local and unimportant in South Carolina, according to Fenner.

Recent literature:

1. Harter, L. L. Mottle necrosis of sweet potatoes. (Abstract) Phytopath. 15: 45. 1925.

2. ———— A physiological study of Mucor racemosus and Diplodia tubericola - two sweet potato storage rot fungi. Jour. Agr. Res. 30: 961-969. May 1925.

3. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-630. Oct. 1, 1925.

4. Rosen, H. R. Sweet potato mosaic and its incubation period of two growing seasons. (Abstract). Phytopath. 16: 74. Jan. 1926.

5. Taubenhaus, J. J. A new foot rot of the sweet potato. Phytopath. 15. 238-240. 1925.

6. Weimer, J. L. Further evidence of the non-transmissibility of the so-called sweet potato mosaic. (Abstract). Phytopath. 16: 74. Jan. 1926.

7. Weimer, J. L. and L. L. Harter. Varietal resistance of sweet potatoes to nematodes, Heterodera radicicola (Greef) Muell., in California. Phytopath. 15: 423-426. 1925.

DISEASES OF BEAN

ANTHRACNOSE CAUSED BY COLLETOTRICHUM LINDEMUTHIANUM (SACC. & MAGN.) BRIOSI & CAV.

The losses from anthracnose in 1925 were reported by most states to be less than last year and less than average. The largest losses reported were from New Mexico, Maine, and New York. No other states reported losses of over one and one-half per cent. No reports of the presence of the disease were received from states west of New Mexico.

Table 27. Estimated average percentage loss from and relative prevalence of anthracnose in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year	State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year
N. Mex.	6	More	More	Mass.	Trace	Less	--
Me.	5	--	--	Del.	Trace	--	--
N. Y.	4	More	--	S. C.	Trace	--	--
Md.	1.5	--	--	Ga.	Trace	Less	Less
Ala.	1.5	Same	Same	Ark.	Trace	Less	Same
La.	1.5	Less	Less	Mich.	Trace	Less	Less
Ohio	1.5	Same	Less	Minn.	Trace	Same	More
N. H.	1	Same	Same	Iowa	Trace	Same	--
Va.	1	Less	--	Kans.	Trace	Same	Same
W. Va.	1	Less	Less	N. Dak.	Trace	Less	Less
Fla.	1	More	--	N. J.	-	Less	Less
Wis.	1	Less	Less	Ind.	-	Same	--
Conn.	0.5	More	Same				

The following are some of the statements from collaborators regarding the disease.

Massachusetts: Less than usual. But few cases reported. (Osmun & Davis)

New York: Allegany County - Found only in White Kidney bean field. Genesee & Wyoming Counties - In many fields and is doing considerable damage, especially on Marrows, but also on Yellow Eyes. No pea bean fields seen. (Barrus)

West Virginia: Much less than usual. No doubt due to very general dry weather. (Sherwood)

Kentucky: Present but not important. (Gardner & Valleau)

Georgia (southern): Reported from only one place, the trucking section around Savannah, on snap and butter beans. Fields decidedly low and wet with ditch draining. Humidity high, temperature cool. (Boyd)

Florida: Wherever beans are grown this disease is present but the damage is moderate. It was worse this year than last. (Weber)

Alabama: Unimportant. Dry weather of past summer stopped development. (Miles & Blain)

Michigan: Dry weather was very unfavorable for anthracnose. Although considerable damage occurred due to late rains, and localized areas were generally infected, the disease was generally inconspicuous and unimportant. (Nelson)

Wisconsin: Wardwell Wax was the only variety seriously affected. (Vaughan)

North Dakota: Not common. Nearly all gardens planted with resistant seed. (Brentzel)

New Mexico: Considerable. No attempt made by growers to select healthy seed. (Crawford)

Recent literature:

1. Schaffnit, E., and K. Böning. Die Brennfleckenkrankheit der Bohnen, eine monographische Studie auf biologischer Grundlage. Centralbl. Bakt. Abt. II, 63: 176-254, 360-438, 481-508. 1925.

BACTERIAL BLIGHT CAUSED BY BACTERIUM PHASEOLI EFS.

In 1925 the largest losses from bean blight were reported from New York, Louisiana, Indiana, and Iowa.

Collaborators' statements concerning prevalence of blight and varietal susceptibility are as follows:

New York: Destroying large patches, chiefly Red Kidneys in Ontario County. Severe in Wayne County. One field of certified beans 70 per cent blighted. In Monroe and Allegany Counties not much bacterial blight, several small areas in each field; blight not nearly so severe as in 1924. Abundant in Wayne County. General in Genesee and Wyoming Counties. Reduction in yield average of all beans 15 per cent, though much greater in Red Kidneys than in other varieties. Some fields of Red Kidneys ruined. (Chupp)

Georgia (southern): Scattered sparingly in Coastal Plain on fall crop (snap beans). Found only in low, damp fields or under irrigation. (Boyd)

Texas: Quite prevalent this year in lower Rio Grande Valley on all wax bean varieties. (Taubenhaus)

Indiana: The most susceptible variety was Burpee's Stringless Greenpod. Rather large canning acreage involved. In variety plots grown by Dr. E. B. Mains at Lafayette, blight occurred on 45 out of 49 varieties. None on Michigan White Wax, New Kidney, or Longfellow. (Gardner)

Michigan: Blight was checked by very dry season and late planting. Developed rapidly late, but too late to cause the usual amount of loss. (Nelson)

Wisconsin: Wardwell Wax most severely injured. We have recommended that this variety be eliminated from next year's plantings by canners. (Vaughan)

Montana: Morris reported it to be severe on Great Northern variety in the Yellowstone section.

Colorado: In Greeley district became severe toward end of season under influence of much moisture. In some cases very severe. The early season was remarkably free from blight. (MacMillan)

Table 28. Estimated average percentage loss from and relative prevalence to bacterial blight in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year	State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year
N. Y.	15	More	--	Ohio	1	Same	Same
La.	5	Less	Less	Minn.	1	Same	More
Ind.	5	More	More	Ariz.	1	--	--
Iowa	5	More	--	Mass.	Trace	Less	Less
Mich.	4	Less	Same	Del.	Trace	Less	Less
Va.	3	Less	--	W. Va.	Trace	Same	Same
Mont.	3	More	More	S. C.	Trace	Less	Less
Tenn.	2	--	--	Ga.	Trace	Less	Less
Wis.	2	More	More	Ark.	Trace	Less	Less
N. Mex.	2	Same	Same	N. Dak.	Trace	Same	Same
Md.	1.5	Same	Same	Idaho	Trace	--	--
Miss.	1	--	--	N. H.	-	Same	Same
Texas	1	--	--	Ala.	-	Same	Same

Recent literature:

1. Hedges, Florence. Bacterial wilt of beans (Bacterium flaccumfaciens Hedges), including comparisons with Bacterium phaseoli. Phytopath. 16: 1-22. Jan. 1926.

BACTERIAL WILT CAUSED BY BACTERIUM FLACCUMFACIENS HEDGES

Bacterial wilt was reported by Barss from Oregon as follows:

"Bacterial wilt was of considerable importance near Eugene in the Blue Lake variety of green bean, affecting about 5 per cent of the plants in mature fields. It occurred only in this variety, of which there were probably 50 acres. Refugee, Kentucky Wonder, and Burpee's Stringless in the same fields were not affected. Beans had not been grown on this land the year before. The seed came from California."

Concerning the present known distribution of bacterial wilt, Miss Hedges says (1):

"The disease has been isolated from wilted navy bean plants from South Dakota, Michigan, Virginia, and Maryland; and from seed from South Dakota, Montana, Michigan, Maryland, District of Columbia, France and Germany. The author believes the disease is rather widely distributed in bean-growing sections but that it has been confused with the blight caused by Bact. phaseoli, and that in all probability the greater part, if not all, of the seedling wilt reported by the Plant Disease Survey of the Bureau of Plant Industry in Indiana, Michigan, Minnesota, New Jersey and Maryland in 1917, Minnesota and Connecticut in 1918, and New Jersey in 1920 was due to Bact. flaccumfaciens. In the summer of 1922 some Michigan fields showed as high as 90 per cent of the crop affected. It was the most serious disease affecting Michigan beans that season."

Recent literature:

1. Hedges, Florence. Bacterial wilt of beans (Bacterium flaccumfaciens Hedges), including comparisons with Bacterium phaseoli. Phytopath. 16: 1-22. Jan. 1926.

RUST CAUSED BY UROMYCES APPENDICULATUS (PERS.) LK.

Rust was reported as occurring in most of the states but the only losses greater than a trace reported were 8 percent on string beans in California, one per cent in New Mexico, and one-half per cent in Texas. Since injury from rust is usually less when the disease appears late in the season than when it appears earlier, dates of its first observed appearance may be of interest. In 1925 they were as follows:

May 1	Georgia	Thomas County
June 18	New Jersey	Bridgeton
July 6	New York	Genesee County
July 14	South Carolina	Gaffney
August 13	Connecticut	Ledyard

MOSAIC, CAUSE UNDETERMINED

The most severe injury from mosaic reported was from the western and middle western states, especially Montana, Arizona, Iowa, Idaho, Indiana, Utah, and California.

In Indiana, Gardner reported the disease to be severe on Kentucky Wonder in gardens. He stated that mosaic occurred in 48 of the 49 varieties grown in Doctor Mains' plots at Lafayette. In Wisconsin, Vaughan stated that it was most prevalent on the Refugee green variety.

Table 29. Estimated reduction in yield of beans due to mosaic, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
8	Montana	Trace	Maine, Massachusetts, New Jersey, Delaware, Maryland, Virginia, West Virginia, South Carolina, Georgia, Florida, Kansas, North Dakota, Kentucky, Louisiana, Arkansas
5	Iowa, Arizona		
4	Idaho		
3	Indiana, Utah, California		
2	New Mexico, Washington		
1	Michigan, Wisconsin, Minnesota		
0.5	New York		

Elmer (1) states that he succeeded in infecting tomato, tobacco, and <u>Nicotiana alata</u> with bean mosaic virus.

<u>Recent literature:</u>

1. Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 39-91. Feb. 1925.

ROOTROT CAUSED BY FUSARIUM SPP.

<u>Dry rootrot caused by Fusarium martii phaseoli Burk.</u> was reported from Maine, New York, Florida, and Indiana, and somewhat doubtfully from Oregon. A loss of 5 to 7 per cent was estimated in New York, where the disease was said by Chupp to be quite serious in many fields throughout the state. Weber reported that in Florida this rootrot was rather scarce, having been collected in only two fields in the central part. In Indiana it was observed only at Lafayette on Kentucky Wonder, according to Gardner. Barss reported from Oregon that "Rootrot, caused by <u>Fusarium</u> (<u>martii</u> probably),

although probably present has not been recognized previously. In a field near Corvallis there was hardly a normal plant in four rows 50 feet long. The roots showed mycelium in the tissue and typical symptoms."

Dry rootrot caused by Fusarium sp. was reported from Idaho by Hungerford who stated that "Tests of varieties have shown Robust very susceptible, Great Northern moderately resistant, and Red Mexican resistant."

Rootrots due to undetermined species of Fusarium were reported from South Carolina, Georgia, Kansas, New Mexico, and California. Boyd stated that in southern Georgia nematode injury predisposed the roots to attack of Fusaria and other organisms.

Recent literature:

1. Small, W. Notes on species of Fusarium and Sclerotium in Uganda. Bul. Misc. Inform. Kew 1925: 118-126. 1925.
Fusarium udum Butl. and Fusarium sp. associated with bean rootrot, together with other organisms.

OTHER DISEASES

Cercospora cruenta Sacc., leafblotch, was reported from Georgia, South Carolina, Florida, Texas, and Porto Rico. Boyd reported it to be more destructive to late bunch and pole beans than to commercial plantings of early bunch beans, and estimated the reduction in yield at 2 per cent in southern Georgia.

Erysiphe polygoni DC., powdery mildew. Florida, Texas, Arizona, California, and Porto Rico reported powdery mildew. Weber states that in Florida "It is generally found during late fall and winter on beans in the southern part of the state." Losses reported as due to powdery mildew were one-half to one per cent in Texas, one per cent in Arizona, and 5 per cent on string beans in California.

Isariopsis griseola Sacc., leafblotch, was reported from Delaware by Adams, and from Florida by Weber who says, "This disease caused considerable damage to beans growing in the late fall. The plants were completely defoliated and the pods often attacked. The loss in several fields was from 70 to 100 per cent. It was reported only from the Florahome section."

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb), rootknot, was reported from Georgia, Texas, and Kansas. Boyd estimated a loss of 5 per cent in southern Georgia. He stated that it was general in the Coastal Plain, being decidedly worse in old gardens and in sandy soils, and apparently thriving in spite of dry weather during the summer. Nematode attack seemed to favor infection by Fusarium and Sclerotium rootrots. Taubenhaus reported rootknot to have been prevalent in light sandy loams in Texas and estimated the loss at one-half per cent.

Corticium vagum Berk. & Curt.. States reporting Rhizoctonia rootrot in 1925 were Massachusetts, New York, Virginia, South Carolina, Georgia, Florida, Texas, New Mexico, and Porto Rico. Chupp wrote that in New York, "Much of the stem canker or rootrot seems to have been caused by this organism because of the wet weather." Weber reported a loss of one per cent in Florida and said that, "This trouble has been very common on beans and ranks with the most important of the bean diseases. It is statewide and can be found in all bean fields." In New Mexico also the loss was estimated at one per cent.

Weber reported a leafblight due to this organism as attacking the first leaves of 50 per cent of seedling plants in a forty-acre field near Florahome, Florida, in September.

Sclerotinia sclerotiorum (Lib.) Mass., stemrot, pod rot (3). New York, Florida, and Washington reported this fungus on beans in 1925. In New York it is never very important, according to Chupp. In Florida, Weber said, "This is general and of major importance in the state, attacking plants in the field often in an alarming manner. It causes the major amount of loss to Florida beans in transit."

Sclerotium rolfsii Sacc., stemrot, reported from Georgia, South Carolina, Florida, and Louisiana.

Small (4) reports that S. rolfsii Sacc., S. bataticola Taub., and several other organisms were found to be associated with a footrot or wilt of beans in Uganda. S. bataticola was the only one of these fungi proving to be pathogenic, except Fusarium udum Butl. under unusual conditions. S. rolfsii as observed in Uganda seems to be saprophytic.

Macrophoma phaseoli Maub., associated with foot or stemrot, was reported from South Carolina by Ludwig. Apparently the first report of the occurrence of this fungus in this country was from the same state in 1923. According to Ludwig the severity of attack seems to be dependent upon the amount of moisture and the disease need not be feared in dry weather.

Thielavia basicola (Berk. & Br.) Zopf, black rootrot. A trace was reported from New York.

Ozonium omnivorum Shear, rootrot, was prevalent in the black lands of Texas, causing a loss estimated by Taubenhaus at 1.5 per cent.

Pythium debaryanum Hesse, damping-off. Porto Rico.

Bacillus carotovorus Jones (1) is reported to be the cause of a new disease of runner beans. It causes a rot of stem, base, and roots, appearing first some three or four weeks after planting.

An undetermined bacterial rootrot was reported by Chupp from Orleans County, New York.

Curly top (?) (undet.). Eubanks Carsner (2) reports the occurrence in Idaho in 1924 of a disease of bean which was apparently due to infection with the virus of sugar beet curly top disease. Experiments indicated that this was the case, but further investigation is necessary before it can be stated definitely that the curly top virus is the cause.

Chlorosis was reported from Texas and Virginia. In Texas, Taubenhaus attributed it to excess of lime in the soil, and estimated the loss due to it at one-half per cent. In Virginia the trouble resembled mosaic and was found in acid soils with a high content of aluminum toxins, according to McWhorter.

Hopperburn. Sherwood of West Virginia says "Early crop of beans extensively injured."

Recent literature:

1. Butcher, R. W. A bacterial disease of the roots of runner beans. Mycological Investigations. Ann. Rept. Exp. & Res. Sta. Nursery & Mark. Gard. Industr. Dev. Soc. 10: 66-69. 1925.

2. Carsner, Eubanks. A bean disease caused by the virus of sugar beet curly-top. (Abstract) Phytopath. 15: 731-732. Nov. 1925.

3. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

4. Small, W. Notes on species of Fusarium and Sclerotium in Uganda. Bul. Misc. Inform. Kew 1925: 118-126. 1925.

5. Tilford, P., C. F. Abel, and R. P. Hibbard. An injurious factor affecting the seeds of Phaseolus vulgaris soaked in water. Papers Michigan Acad. Sci. 4: 345-356. 1925.

DISEASES OF LIMA BEAN

BACTERIAL SPOT CAUSED BY BACTERIUM VIGNAE GARDNER & KENDRICK (B. VIRIDIFACIENS TISDALE & WILLIAMSON)

The following reports of bacterial spot were received in 1925:

Delaware: Observed August 12 at Wyoming, Kent County, on pole limas. Five per cent of the pods showed infection. This is the first report for the state. (Adams)

Indiana: Not serious (but rather prevalent in Floyd County). Mainly leafspot. Noted in plots on varieties New Wonder, King of the Garden, and Giant Podded. Good resistance shown by Henderson's Bush. (Gardner)

Michigan: More than usual; of major importance in canning crop. Caused a loss of 10 per cent. Destructive to early plantings. The disease is seed-borne and it is very difficult to obtain clean seed. All seed treatments tried proved to be failures. (Nelson)

Gardner and Kendrick (2) report that *Bacterium viridifaciens*, described by Tisdale and Williamson on lima bean in 1923 (3), is the same organism as *B. vignae* Gardner & Kendrick, originally reported on cowpea (1). A number of legumes besides cowpea and lima bean have been found by observation and experiment to be hosts for this disease. Lima beans found to be susceptible include the varieties Large White Pole, Giant Podded Pole, and King of the Garden among pole limas (*Phaseolus limensis*), Burpee's Bush and Fordhook bush limas (*P. limensis limenanus*), and the dwarf sieva bean (*P. lunatus lunonanus*) as represented by Henderson's Bush. The disease, especially the leaf attack, seems to be very severe on limas.

The organism is carried in the seed, and long storage seems to eliminate it. Suggestions for control include primarily the use of disease-free seed, which can be obtained in small quantities by seed selection from disease-free pods. The use of two or three-year old seed should also result in a decreased amount of primary infection. Rotation of crops is advisable as a supplementary measure.

Recent literature:

1. Gardner, Max W., and James B. Kendrick. Bacterial spot of cowpeas.

Science n. s. 57: 275. March 2, 1923.

2. Gardner, Max W., and James B. Kendrick. Bacterial spot of cowpea and lima bean. Jour. Agr. Res. 31: 841-863. Nov. 1, 1925.

3. Tisdale, W. B., and M. M. Williamson. Bacterial spot of lima bean. Jour. Agr. Res. 25: 141-154. 1923.

OTHER DISEASES

Downy mildew caused by *Phytophthora phaseoli* Thax. was reported from Connecticut, New York, New Jersey, and Pennsylvania. In Connecticut there was considerable injury in one or two fields, according to Clinton. The loss on Long Island was estimated by E. E. Clayton at 10 per cent.

Leonian (1) makes *P. phaseoli* a variety of *P. infestans*.

Bacterial blight caused by *Bacterium phaseoli* EFS. was reported from Maryland and Indiana.

Pod blight caused by *Diaporthe phaseolorum* (Cke. & Ell.) Sacc. Unimportant in New Jersey (Dept. Plant Path.); a trace in Delaware (Adams).

Yeast spot caused by *Nematospora phaseoli* Wingard is reported by Wingard (2) as having been found on lima beans in Virginia and Illinois and in seed from Tennessee and Alabama. Other hosts than lima beans on which he has observed it, in each case only once, are Birdeye beans (*Phaseolus vulgaris*), Black Eye cowpeas (*Vigna sinensis*), and sweet potato. The small lima or sieva bean seems to be the most susceptible host. Larger types also are attacked, but not severely as a rule. The puncture of the green bug (*Nezara hilaris*) is apparently the only means of natural infection.

Mosaic (undet.) was reported from Delaware and Louisiana, and Gardner stated that in Indiana a few cases were noted in plots of Henderson's Bush.

Recent literature:

1. Leonian, Leon H. Physiological studies on the genus Phytophthora. West Virginia Agr. Exp. Sta. Sci. Paper 11. Reprinted from Amer. Jour. Bot. 12: 444-498. July 1925.

2. Wingard, S. A. Studies on the pathogenicity, morphology, and cytology of Nematospora phaseoli. Bul. Torr. Bot. Club. 52: 249-290. June 1925.

DISEASES OF ONION

SMUT CAUSED BY UROCYSTIS CEPULAE FROST

In 1925 onion smut was reported from Massachusetts, New York, Maryland,

Kentucky, Ohio, Illinois, Wisconsin, Minnesota, Iowa, North Dakota, Kansas, and Oregon.

Table 30. Losses from onion smut in 1925 as reported by collaborators.

Percentage: loss	States reporting	Percentage: loss	States reporting
10	New York	Trace	Maryland, Minnesota, Kansas
8	Wisconsin		
1	Ohio, Oregon		

It is gratifying to note that the majority of the collaborators report successful control of onion smut by the formaldehyde drip treatment. This method consists in the application of formaldehyde to the seed at planting time from a tank which is attached to the seed drill. Walker (5) recommended a 1-128 solution of formaldehyde applied at the rate of 200 gallons per acre. Anderson and Osmun (1) found that in Massachusetts a 1-50 solution could be used successfully at the rate of 60 to 80 gallons per acre, the largest amounts being required when the soil was wet.

Following are notes from collaborators on the prevalence and control of onion smut.

Massachusetts: Serious in absence of control measures. Formaldehyde treatment in general use throughout the Connecticut Valley. (Osmun & Davis)

New York: Onions on old muck rather severely infected. Infested area increasing in size in Genesee and Orleans Counties. Occurrence general in Wayne County. Satisfactory control by formaldehyde. (Chupp)

Ohio: Losses from smut decrease from year to year owing to the successful use of the formaldehyde drip. There is one large onion growing section in Ohio where smut appeared for the first time this year. (H. C. Young)

Illinois: Quite prevalent in the set-producing district about Chicago, but always well controlled where formaldehyde was carefully applied. (Tehon)

Wisconsin: Of major importance where not treated. The formaldehyde drip treatment is generally employed by large growers near Racine. (Vaughan)

Kansas: About one per cent in seedlings from Canary Island seed. None in native seed. (White) Note: Walker (6) in his survey of onion diseases in the Canary Islands did not observe any onion smut.

Oregon: Formaldehyde treatment very successful. (Barss)

Anderson (1), in studies on the susceptibility to smut of 39 species of Allium and 54 varieties of cultivated onion, found that the species could be divided on this basis into four classes, with the cultivated onion, (Allium cepa), shallot (A. ascalonicum), and chives (A. schoenoprasum), as well as other species including some native American ones, in the first or most susceptible group. None of the varieties of A. cepa tested showed any degree of resistance to smut. Infection takes place only through the cotyledons, and the disease does not occur in species which reproduce by bulblets. In the first class, after the primary attack the fungus may infect the growing point, thereafter producing lesions on the true leaves and finally killing the plant. In classes 2 and 3 only the cotyledons were affected, while no infection occurred on species in class 4, which seemed to be entirely resistant. The "Winterbeck onion", which may be a distinct species or only a variety of A. cepa proved to be practically immune to smut, and is regarded by Anderson as the logical parent species to use in breeding for a smut-resistant onion.

Urocystis cepulae is apparently the only species of Urocystis found on Allium cepa. Other Urocystes described on other species of Allium seem to be distinct. Anderson believes that U. cepulae originated in America, probably on one of the native western species included in the most susceptible group.

Recent literature:

1. Anderson, P. J. Comparative susceptibility of onion varieties and of species of Allium to Urocystis cepulae. Jour. Agr. Res. 31: 275-286. Aug. 1925.

2. ----------- and A. V. Osmun. The smut disease of onions, Massachusetts Agr. Exp. Sta. Bul. 221: 1-29. 1924.

3. Blizzard, Alpheus Wesley. Nuclear phenomena and life history of Urocystis cepulae. (Abstract) Phytopath. 16: 69. Jan. 1926.

4. Leach, J. G., and H. A. Rodenhiser. Onion smut control. Minn. Hort. 53: 113-115. April 1925.

5. Walker, J. C. Onion diseases and their control. U. S. Dept. Agr. Farmers' Bul. 1060: 1-23. 1919.

6. ----------- Observations on the cultivation and diseases of cabbage and onions in Europe, 1922. Plant Disease Reporter Supplement 32: 1-34. Feb. 15, 1924.

DOWNY MILDEW CAUSED BY PERONOSPORA SCHLEIDENI UNG.

Downy mildew was reported from Massachusetts, New York, Georgia, Wisconsin, North Dakota, Oregon, and California. In Massachusetts it was said to be very serious throughout the Connecticut Valley, and caused a loss estimated at 15 per cent. In California very heavy losses occurred in the onion seed crops in the Sacramento, San Joaquin, and Santa Clara Valleys. H. A. Jones estimated a loss to the seed crop of the state of 75 to 80 per cent, J. T. Rosa estimated 60 per cent, and D. G. Milbrath reported 80 per cent. Rosa

reported on this disease in July as follows:

> "Complaints of dying of onions being grown for seed began to come in during April, and proved to be due primarily to mildew attacking the leaves and primary seed stalks. White varieties are attacked earliest and most severely. The disease was more severe where onions had been grown before. The yield of onion seed will be reduced by 60 per cent. Several thousand acres are involved. Early in June large acreages of market onions grown from seed were also attacked."

Regarding varietal susceptibility as observed in California, H. A. Jones stated that, "The foreign types like Giant Gibraltar, Sweet Spanish, Prizetaker, etc., with light green tops, appear to be somewhat more resistant than the storage varieties like Yellow Globe, Danvers, and Southport."

NECK ROT CAUSED BY BOTRYTIS SPP.

Neck rot said to be due to Botrytis allii Munn was reported in 1925 from New York, Virginia, Washington, and California. Specimens received from Virginia and California were determined by Dr. J. C. Walker to be this species. In Virginia the disease occurred on shallots in James City County and on Yellow Danvers onions from Illinois sets in Accomac County. The disease was thought to be the chief cause of low germination and rot of spring onions in Accomac County, one of the leading onion growing counties of Virginia according to McWhorter. Horne reported that in California, "White onions are most seriously affected - up to 15 per cent loss in some lots in November."

Neck rot caused by Botrytis sp. was reported from Virginia (Eastern Shore), Indiana, Wisconsin, Arizona, and Idaho. A loss of one per cent was estimated in Arizona, and a trace in Wisconsin.

> Wisconsin: Less than usual, too dry at harvest time. Drying experiments lacked definiteness because weather was so dry that no neck rot developed to amount to anything in natural curing. (Vaughan)
>
> Idaho: More than usual; considerable injury in Boise Valley and Twin Falls section. (Hungerford)

Walker (3) describes two new species of Botrytis associated with the neck rot disease of onion, in addition to Botrytis allii which was described by Munn (1) from Michigan and New York in 1917, and since that time observed in a number of states. Since these three species produce distinct, although similar symptoms, Walker has given them the following distinguishing names: 1, - the grey mold neck rot caused by Botrytis allii Munn; 2, - the mycelial neck rot caused by Botrytis byssoidea Walker; and 3, - the small sclerotial neck rot caused by Botrytis squamosa Walker. All three species are found in the Wisconsin and Illinois sections. B. byssoidea occurs also in Connecticut and in France. The mycelial neck rot causes by far the greatest losses in the Wisconsin and Illinois section, while the small sclerotial neck rot, found only upon white varieties and confined more particularly to the dry outer scales of the bulbs, is the least destructive. It has been found that the

mycelial neck rot can be controlled by artificial curing (2).

In two other recent papers (4, 5) Walker reports results of continued studies on disease resistance in the onion. Colored varieties show resistance to smudge and neck rot which seems to be correlated with the presence in the dry outer scale tissue of the bulbs of a readily dissolvable substance, toxic to the fungous spores. This substance is not present in bulbs of white varieties, nor does it occur in the succulent tissue of colored varieties, as shown by the fact that spores placed directly on the succulent tissue will infect even colored bulbs.

Concerning susceptibility to Botrytis allii and Botrytis sp. (neck rot), Walker says (4):

> "Under moderately favorable conditions for infection, white varieties are often severely affected, while colored varieties remain quite free from the disease. Under the most favorable conditions for infection, however, the disease is often of consequence in the colored bulbs, but the degree of difference between them and the white bulbs remains essentially the same."

Recent literature:

1. Munn, M. T. Neck rot disease of onions. New York (Geneva) Agr. Exp. Sta. Bul. 437: 363-455. 1917.

2. Walker, J. C. Control of mycelial neck rot of onion by artificial curing. Jour. Agr. Res. 30: 365-373. Feb. 15, 1925.

3. ----------- Two undescribed species of Botrytis associated with the neck rot disease of onion bulbs. Phytopath. 15: 708-713. Nov. 1925.

4. ----------- Studies on disease resistance in the onion. Proc. Nation. Acad. Sci. 11: 183-189. March 1925.

5. -----------, C. C. Lindegren, and F. M. Bachmann. Further studies on the toxicity of juice extracted from succulent onion scales. Jour. Agr. Res. 30: 175-187. Jan. 15, 1925.

WHITE ROT CAUSED BY SCLEROTIUM CEPIVORUM BERK.

White rot was reported for the first time from Kentucky in 1925. Heretofore it had only been reported in this country from Oregon and Virginia. It was reported again in 1925 from Virginia. Specimens were sent in both from Kentucky and Virginia, and the identification of the fungus as Sclerotium cepivorum was confirmed by J. C. Walker.

McWhorter stated that in Virginia it occurred in the same locality in which it was found last year, that it developed in new ground during

March on sets of shallots which came from New Orleans, Louisiana, and that it was evidently introduced on the seed. Regarding its occurrence in Kentucky, Valleau wrote:

> "The disease appeared in the Prestonia neighborhood near Louisville. An area of about 150 feet by 50 or 60 feet was affected, as closely as we could judge, although the onions had been dug. It is in a bottom with drainage which centrally reaches a sewer, so that there is little danger of spread on the farm, at least from drainage water. Within about 25 or 30 feet of the infected area was a crop of onion sets being grown for the market. I was entirely unable to find any signs of injury to the plants next to the infected area or in any other part of the field.
>
> "About five years ago onion sets in this field were completely killed out in this same area. At the time it was thought the trouble was caused by an excessive amount of smut. Previous to that time onions had been grown in the field and no particular trouble was observed, but since that time one crop of onions was grown but no trouble was observed."

PINK ROOT CAUSED BY FUSARIUM MALLI TAUB.

In Louisiana pinkroot caused considerable damage in 1925 as usual, according to Tims. Taubenhaus reported it to be prevalent in Texas, and estimated a loss of one per cent. In California, Milbrath reported pink root to be worse than last year, estimating the loss for the state at one-half per cent. Reports from Ohio and California are as follows:

<u>Ohio:</u> Pink root is quite generally distributed over the state and in some sections, where rotations have not been practiced, there have been some severe losses. (H. C. Young)

<u>California:</u> This disease is again prevalent on onions grown in the warmer parts of the state, attacking both mother-bulbs grown for seed production, as well as seedlings of the market crop. There is some evidence that the disease may occur where onions have never been grown before. (Rosa)

OTHER DISEASES

<u>Colletotrichum circinans</u> (Berk.) Vogl., smudge, occurred widely but was reported in 1925 from Virginia and Wisconsin only, on white onions. Walker (3, 4) has continued his studies on the toxicity of onion juice to this and other organisms (See Botrytis).

<u>Fusarium</u> spp. (1, 4). Bulbrot was reported in 1925 from New York, Indiana, Minnesota, Iowa, Idaho, and Washington, and a specimen of <u>F. cepa</u> Hanzawa was received from Ohio. The following report was received from Washington:

"This disease has been common and severe in the early onion section of the Walla Walla district. Its importance has been mentioned in reports of other years. It has not caused such large losses as in other years, due partly to spring onions being generally planted because of the general killing out of winter onions last winter." (Dept. Plant Path.)

Fusarium sp. Brittle was reported again from New York.

Macrosporium parasiticum Thüm. was reported as causing considerable loss locally in New York. The seed crop in Louisiana was damaged, according to Tims. In Minnesota the disease was said to be very common in the Plainview district, causing, or at least being associated with, early maturity.

Aspergillus niger Tiegh. black mold, caused losses estimated at one-half per cent in Texas, a trace in Arizona, and together with other surface molds, at 5 per cent in Indiana. Walker's work (3, 4) has not indicated any difference between white and colored varieties in susceptibility to this fungus.

Bacterial softrot was reported from New York, Indiana, Minnesota, and Arizona. A loss of one per cent was estimated in the last-named state.

Rots due to Penicillium, bacteria, etc., which developed during storage preceding transportation or in cars, were reported from Missouri.

Purple blight (undet.), New York "Purplish necrotic spots, which grew in size, were found on the leaves. This disease was observed for the first time in two fields. A Macrosporium was associated with the lesions on plants which were apparently not attacked by M. parasiticum." (Felix)

Striped foliage, thought to be due to toxicity of elm wood, was reported from New York by Felix, as follows "A distinct striping of leaves, yellowing and slight stunting. First observed in a mill yard which had been planted to onion and later in several muck fields in widely scattered areas. Leaves of Carex and certain grasses are also striped. In onions the striping appeared to bear no relation to the distribution of the veins. Lettuce and potatoes are yellowed and stunted."

Recent literature:

1. Link, G. K. K., and Alice A. Bailey. Fusaria causing bulb-rot of onions. (Abstract) Phytopath. 16: 74-75. Jan. 1926.

2. Ramsey, G. B., and L. F. Butler. Ammonia injury of fruits and vegetables in storage. (Abstract). Phytopath. 16: 73. Jan. 1926.

3. Walker, J. C. Studies on disease resistance in the onion. Proc. Nation. Acad. Sci. 11: 183-189. March 1925.

4. -----------, C. C. Lindegren, and F. M. Bachmann. Further studies on the toxicity of juice extracted from succulent onion scales. Jour. Agr. Res. 30: 175-187. Jan. 15, 1925.

DISEASES OF CRUCIFERS

CABBAGE

YELLOWS CAUSED BY FUSARIUM CONGLUTINANS WOLL.

Yellows was reported in most of the states east of Colorado and New Mexico. The largest losses in 1925 were reported from Iowa, Kansas, and West Virginia. Many collaborators report that the disease is more severe in home gardens than in commercial plantings, due to the fact that commercial growers avoid planting cabbage in infested soil. Miles and Blain state that in Alabama it is controlled to some degree by early planting. States reporting successful control from the use of yellows-resistant varieties are Maryland, Kentucky, Ohio, and Indiana. Progress in the selection of resistant varieties is reported from the Wisconsin, Iowa, and Missouri stations.

Kentucky: More specimens received this year from home gardens than usual. Commercially not important as growers do not use infested soil. Yellows-resistant All Seasons successful on infested soil at Louisville. (Valleau & Gardner)

Florida: Found in a single field near Gainesville where it was causing 50 per cent damage. Very seldom observed because plants are grown in winter and harvested when heads weigh from 2 to 4 pounds. (Weber)

Michigan: Minor importance, apparently confined so far to local areas in southern portion of the state. One seed company reports strong indications of seed transfer of the organism. Variety Volga very susceptible. (Nelson)

Kansas: Iacope showed 40 to 50 per cent yellows in one test in Topeka. (White)

Table 31. Relative prevalence of and losses caused by cabbage yellows in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year	State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year
Iowa	20	Same	--	N. Y.	0.5	--	--
Kans.	10	Same	Same	Mich.	Trace	Same	Same
W. Va.	10	More	More	Minn.	Trace	More	More
Md.	8	Same	Same	N. J.	-	Same	Less
Ohio	6	Less	Same	Del.	-	Less	Less
Texas	4	--	--	Ark.	-	Same	Same
Ala.	3	Same	Same	Ind.	-	Less	--
N. Mex.	3	More	More	Wis.	-	More	Same

Recent literature:

1. Jones, L. R., J. C. Walker, and John Monteith, Jr. Fusarium resistant cabbage: progress with second early varieties. Jour. Agr. Res. 30: 1027-1034. June 1925.

2. Quinn, J. T. Cabbage seed selection for disease resistance. In Mumford, F. B. New knowledge. Missouri Agr. Exp. Sta. Bul. 228 (Ann. Rept. Director 1923/24): 61-62. Jan. 1925.

3. Russell, H. L., F. B. Morrison, and W. H. Ebling. Cabbage disease studies. In New pages in farm progress. Wisconsin Agr. Exp. Sta. Bul. 373 (Ann. Rept. Director 1923/24): 14-15. April 1925.

4. Van Haltern, Frank, and A. T. Erwin. A yellows resistant strain of Copenhagen market cabbage, Iacope. (Abstract) Phytopath. 16: 72. Jan. 1926.

5. Walker, J. C. Studies upon the inheritance of Fusarium resistance in cabbage. (Abstract) Phytopath. 16: 87. Jan. 1926.

6. -----------, John Monteith, Jr., and F. L. Wellman. A new Fusarium resistant cabbage. (Abstract) Phytopath 16: 72-73. Jan. 1926.

BLACKROT CAUSED BY BACTERIUM CAMPESTRE (PAM.) EFS.

Blackrot was reported from approximately the same territory as yellows. In most states collaborators regarded the disease as relatively unimportant in 1925. The largest estimated loss was 7 per cent reported by Miles and Blain from Alabama, where blackrot was said to have been quite serious locally in the southern part of the state. Other loss estimates were 4 per cent, Minnesota; 2 per cent, Ohio; one per cent, West Virginia, Texas; trace, New York, Maryland and Georgia.

Following are statements from some of the collaborators on the occurrence and control of blackrot.

New York: Long Island loss is estimated at from 3 to 5 per cent. Several cases noted in Erie County. Present in seedbeds where seed treatment was not practiced in Nassau County. Seed treatment is gradually eliminating this trouble. (Chupp)

Kentucky: In some gardens blackrot was very prevalent. Imported plants of "Frostproof" developed considerable trouble. (Gardner)

Florida: Collected in the state, but not important. (Weber)

Ohio: The disease occurred primarily on late growing cabbage and was partly responsible for breakdown in transit. (H. C. Young)

Illinois: Much less prevalent than usual. We have but one observation, and there were no reports. (Tehon)

Minnesota: Present in all cabbage growing sections in certain fields. One seed treatment demonstration (mercuric chloride) failed to control the disease. (Sect. Plant Path.)

New Mexico: Trace, not important. Most growers treat their seed. (Crawford)

Recent literature:

1. Russell, et. al. See yellows.

2. Samuel, Geoffrey. "Blackspot" (sic) disease of cabbages and cauliflowers. Jour. Dept. Agr. South Australia 28: 974. June 1925. (Should be black rot).

3. ----------- Black rot of cabbages and cauliflowers in South Australia. Jour. Dept. Agr. South Australia 28: 1071-1076. July 1925.

BLACKLEG CAUSED BY PHOMA LINGAM (TODE) DESMAZ.

Twelve states reported no blackleg and fifteen reported it present and either severe locally or unimportant. In Maryland it is one of the most prevalent and destructive diseases in the important Patapsico Neck trucking section, which is located in Baltimore County just outside of Baltimore city. The intensive production of cabbage there makes long-time rotation difficult to practice, hence it is not easy for the cabbage growers to rid their soil of the pathogen, after it once becomes well established. The loss from blackleg in Maryland was estimated at one and one-half per cent. Other loss estimates were 2 per cent in Minnesota; and a trace in West Virginia and Iowa. Following are some of the statements from collaborators regarding blackleg.

Massachusetts: Very serious in some instances. (Osmun & Davis)

Connecticut: Two reports of moderate injury. (Clinton)

New York: Serious in some fields in Ontario County. (Burrill)
Caused severe losses in a few fields. As more urgent requests are brought to bear upon the seed grower for clean seed, this trouble will finally disappear. All our local seed grower's are making determined efforts to grow healthy seed. (Chupp)

New Jersey: In one field severe infection was found in Low Flat Dutch and All Season. These same varieties from another plant bed planted in adjacent rows showed no infection. (Dept. Plant Path.)

Virginia: A serious form is present on the spring crop in the Tidewater section. Diseased plants generally die before forming a head. Typical stem and leaf lesions present. (McWhorter)

Wisconsin: One badly infested seed bed north of Racine from which plants were distributed. Growers need more education as to dangers of selling diseased plants. (Vaughan)

Minnesota: Very bad in a few fields in the vicinity of St. Paul. Several outbreaks traced to one lot of plants from a seed bed planted in one end of an old cabbage field. (Sect. Plant Path.)

Recent literature:

1. Rex, E. G. Experiments on the control of black-leg disease of cabbage. Pennsylvania Agr. Exp. Sta. Bul. 199: 1-23. Oct. 1925.

2. Russell, et. al. See yellows.

CLUBROOT CAUSED BY PLASMODIOPHORA BRASSICAE WOR.

Clubroot was reported from thirteen states in 1925, all of which are located in the north-central or northeastern part of the country. It was reported not found in twelve states located mostly in the South and West. The absence of clubroot from these sections is due to the fact that the clubroot organism (Plasmodiophora brassicae) thrives best where soil temperatures are comparatively low. In most of the states from which clubroot was reported it was considered relatively unimportant except locally.

Maryland: Limited almost entirely to higher altitudes in Garrett and Allegany Counties where it is severe in most home gardens and in a few fields. (Temple & Jehle)

Ohio: One field of 20 acres of cabbage grown on muck land was about a total loss. Mostly occurs, however, in gardens. Estimated loss for state 2.5 per cent. (H. C. Young)

Michigan: Has been reported each year for some time from Grand Rapids and vicinity. (Nelson)

Minnesota: Present in about the usual amount. Probably a little more abundant than last year. Seems to be spreading slowly throughout cabbage growing sections. (Sect. Plant Path.)

Recent literature:

1. Ludwigs, Karl. Die Bekämpfung der Kohlhernie (Plasmodiophora brassicae). (The control of club root.) Mitteil. Deutsch. Landw. Ges. 40: 314-316. April 25, 1925.
Use of uspulun for soil disinfection.

2. Riehm, E. Zur Bekämpfung der Kohlhernie. Deut. Obst. u. Gemüseb. Zeit. 71: 193-194. April 10, 1925.

DAMPING-OFF AND WIRESTEM CAUSED BY CORTICIUM VAGUM BERK. & CURT.

In a recent publication (1), Gratz has proposed the name "wirestem" for plants attacked by the fungus Corticium vagum in the damping-off stage, but later recovering. The strain of Corticium vagum causing wirestem is thought to be physiologically distinct from that causing potato disease, since neither strain is pathogenic to the host of the other.

The following report of wirestem was received by the Survey from R. P. White of Kansas:

> "This year has seen two unmistakable cases of disease being brought into the state on plant parts. Mr. A. M. Walker, nurseryman at Pittsburg, Kansas, sent in specimens of cabbage plants which he had received from Thomasville, Georgia. These plants showed typical wirestem as described by L. O. Gratz, and Rhizoctonia solani was easily isolated from the diseased stems. This does not represent a serious introduction, I feel, since we have plenty of Rhizoctonia solani in our soils that would probably infect cabbage seedlings if conditions were favorable. It is notable, however, that I have never seen this disease in the cabbage seedling beds of this state."

Damping-off due to this organism was reported from Connecticut and New York, footrot from South Carolina, and stem and rootrot from Louisiana.

Recent literature:

1. Gratz, L. O. Wire stem of cabbage. New York (Cornell) Agr. Exp. Sta. Mem. 85: 3-60. Jan. 1925.

DOWNY MILDEW CAUSED BY PERONOSPORA PARASITICA (PERS.) D BY.

The largest loss from downy mildew in 1925 was 6 per cent reported from Texas by Taubenhaus, who stated that the disease was "very prevalent on early cabbage." A trace was reported by Chupp in New York. Other states reporting downy mildew were Virginia, Florida, Louisiana, and Washington.

Virginia (Norfolk Section): The cabbage here, especially in wind-blown areas, is being yellowed by a field infection of Peronospora parasitica. The peculiar thing about this season's appearance is the fact that it is attacking rather large plants, some of which are beginning to head out. The farmers have mistaken the disease for yellows. It appeared after a period of warm weather, followed by six days of cool weather. (McWhorter, April 9)

Florida: Downy mildew is very common on cabbage at all times, especially in the seed bed. Its occurrence is general over the state and occasionally the damage to mature heads is considerable. (Weber)

Louisiana: Some damage to young plants. (Tims)

Recent literature:

1. Ocfemia, G. O. The occurrence of the white rust of crucifers and its associated downy mildew in the Philippines. Philipp. Agr. 14: 289-296. Oct. 1925.

OTHER DISEASES

Alternaria brassicae Berk. & Curt., black leafspot. Reported from New York (general; estimated loss one to 3 per cent), South Carolina, Georgia, Florida, Iowa (estimated loss, trace), and Porto Rico. One field in Cortland County, New York, according to Chupp, showed very severe infection where the soil was unusually heavily fertilized.

Bacillus carotovorus Jones, softrot, was reported only from New York, Wisconsin, Minnesota, and Iowa in 1925. In New York it was statewide and important on mother seed plants, according to Chupp, causing a loss of one to 5 per cent in seed cabbage and a trace in field cabbage. In Wisconsin, where there was less than usual, it followed injury by blackrot, blackleg, or maggots, according to Vaughan. In Minnesota the Section of Plant Pathology reported that it occurred chiefly in the form of "stump rot" and was very severe in some fields following an attack of cabbage maggots. Iowa reported a loss of one per cent.

Bacterium maculicolum McC., peppery leafspot, occurred in Connecticut for the first time, according to Clinton, and was reported from New York also.

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb), rootknot. In Georgia rootknot was said by Boyd to be common in home gardens but not in larger plantings, losses slight. Taubenhaus reported it to be prevalent in light sandy loams in Texas, estimating the loss for the state at one-half to one per cent.

A species of Pythium, believed to belong to the debaryanum group, was isolated by Drechsler (3) from cabbage showing watery softrot, and in inoculation experiments proved capable of reproducing the decay.

Sclerotinia sclerotiorum (Lib.) Mass. (1, 2) watery softrot, drop. New York "Loss, trace to 1 per cent; statewide on late harvested kraut cabbage." (Chupp). Florida "Considerable damage was caused in the field by this disease, although it was not common. It caused 50 per cent loss, attacking the heads, in several fields." (Weber). Davis (1, 2) reports this organism causing drop of common cabbage and Chinese cabbage in Massachusetts.

Sclerotium rolfsii Sacc., stemrot. Reported from Texas and Georgia.

Recent literature:

1. Davis, W. H. Drop of Chinese cabbage and common cabbage. (Abstract) Phytopath. 15: 50. 1925.

2. Davis, W. H. Drop of Chinese cabbage and our common cabbage caused by Sclerotinia sclerotiorum (Lib.) Massee (Sclerotinia libertiana Fckl.) Phytopath. 15: 249-259. May 1925.

3. Drechsler, Charles. Pythium infection of cabbage heads. Phytopath. 15: 482-285. 1925.

4. Ocfemia, G. O. The occurrence of the white rust of crucifers and its associated downy mildew in the Philippines. Philipp. Agr. 14: 289-296. Oct. 1925.

CAULIFLOWER

WIRESTEM CAUSED BY CORTICIUM VAGUM BERK. & CURT.

Wirestem was reported from New York and Virginia.

New York: Estimated loss for state one to 3 per cent. Important in some seedbeds and fields; statewide. In Delaware County fully half the cauliflower growers used mercuric chloride in seedbed with excellent results. Almost entirely controlled where one ounce of mercuric chloride to 10 gallons of water was applied three to five times. A few seedbeds were completely destroyed in Onondaga County. (Chupp).

Virginia: Wirestem was important in flat and coldframe plantings in Norfolk County during the early spring. The disease responded quickly to organic mercury treatments. (McWhorter)

PEPPERY LEAFSPOT CAUSED BY BACTERIUM MACULICOLUM MC.

Peppery leafspot was observed in Connecticut for the first time, according to Clinton, and was reported also from New York and Florida.

New York: Occurs wherever cauliflower is grown in the state; important in some seedbeds. Caused a loss of one to 2 per cent. In a survey of cauliflower seedbeds in the Catskill region, little or no spotting was found where the seed had been treated with mercuric chloride 1-1000. In a few untreated beds the disease caused much loss. It was quite noticeable on early cauliflower in Nassau County. (Chupp)

Florida: Collected in scattered places in the state, not important. (Weber)

OTHER DISEASES

Alternaria brassicae (Berk.) Sacc., black leafspot, unimportant in Delaware; severe in one five-acre planting in New Jersey.

Bacterium campestre (Pam.) EFS., blackrot. Virginia (Tidewater region; also on broccoli), Iowa (loss 2 per cent).

Fusarium conglutinans Woll., yellows, Wisconsin.

Phoma lingam (Tode) Desm., blackleg. Reported by McWhorter as common and severe in the Norfolk section of Virginia.

Plasmodiophora brassicae Wor., clubroot. Western Maryland, Michigan, Wisconsin.

Damping-off caused by several organisms. "A survey was made of cauliflower seedbeds on 21 farms in the Catskill region of Delaware County, New York. Where no control measures were practiced there was considerable damping-off, in a few cases as much as 20 per cent. Where copper sulfate, copper carbonate, or corrosive sublimate was used there was little or no damping-off." (Chupp)

Whiptail (nonpar.) was again reported from Long Island, New York, where it caused a loss estimated at 15 per cent. A trace was reported from the Catskill region.

BRUSSELS SPROUTS

Blackleg caused by Phoma lingam (Tode) Desmaz. was reported only from New York in 1925, although it doubtless occurs in other states. In New York the loss was estimated at one to 3 per cent. Much injury to Brussels sprouts in the Catskill region was reported. In regard to control Chupp says, "As more urgent requests are brought to bear on the seed grower for clean seed, this trouble will finally disappear."

CHARLOCK

Powdery mildew caused by Oidium sp. New Jersey; produced flour-like patches on the leaves.

CHINESE CABBAGE

Drop caused by Sclerotinia sclerotiorum (Lib.) Mass. was reported by Davis (2) from Massachusetts. Davis stated that this was apparently the first report of the occurrence of this organism on Chinese cabbage.

Leafspot caused by Cylindrosporium sp. A single report from Florida.

Recent literature:

1. Davis, W. H. Clubroot of Chinese cabbage. Mycologia 17: 160-162. July-Aug. 1925.

2. ----------- Drop of Chinese cabbage and our common cabbage caused by Sclerotinia sclerotiorum (Lib.) Massee (Sclerotinia libertiana Fckl.) Phytopath. 15: 249-259. May 1925.

C O L L A R D S

Blackrot caused by Bacterium campestre (Pam.) EFS. was reported by McWhorter as very severe in the Norfolk region of Virginia during the fall of 1925.

H O R S E R A D I S H

White rust caused by Albugo candida (Pers.) Kuntze, New York, statewide, loss, a trace to 1 per cent.

Gray leafspot caused by Alternaria herculea (Ell. & Mart.) Elliott, Delaware, New Jersey.

Leafspot caused by Cercospora armoraciae Sacc., Indiana.

Leafspot caused by Ramularia armoraciae Fckl., New York, causes much leaf injury, statewide, estimated loss 1 to 2 per cent, New Jersey.

Mosaic (Undet.). Trace reported from New York.

K A L E

Blackrot caused by Bacterium campestre (Pam.) EFS. was reported from the Norfolk section of Virginia, but very little was observed and it was of no importance according to McWhorter.

Recent literature:

1. McWhorter, Frank P. Blackrot of kale. Virginia Truck Exp. Sta. Bul. 49: 359-363. Oct. 1924.

K O H L R A B I

Yellows caused by Fusarium conglutinans Woll., Indiana and Wisconsin.

M U S T A R D

White rust caused by Albugo candida (Pers.) Kuntze. More than last year in Florida; less in New York.

Downy mildew caused by Peronospora parasitica (Pers.) D By was collected in Florida.

R A D I S H

Blackroot caused by Pythium aphanidermatum (Edson) Fitz. Reported from Indiana and Kansas. In Indiana it was serious in some home gardens and seemed to be especially prevalent around Lafayette. In Kansas, two entire crops of the White Icicle variety were reported lost.

Blackrot caused by Bacterium campestre (Pam.) EFS. was reported by Chupp as occurring each year on volunteer radishes in one garden in Tompkins County, New York.

White rust caused by Albugo candida (Pers.) Kuntze was reported from New York and Indiana.

Spot caused by Alternaria sp., Indiana, caused black lesions on leaves, peduncles, and seed pods. (Gardner)

Softrot caused by Bacillus carotovorus Jones (1). New York.

Downy mildew caused by Peronospora parasitica (Pers.) D By. was reported from New York and Indiana.

Mosaic (Undet). A typical mosaic mottling and deformation of leaves occurred on ten varieties in experimental plots at Lafayette, Indiana. First record of this disease.

Recent literature:

1. Roldan, E. F. Notes on soft rot of radish. Philipp. Agr. 14: 185-188. Aug. 1925.

R U T A B A G A

Scab caused by Actinomyces scabies (Thax.) Guess., New Jersey.

Leafspot caused by Cercosporella albo-maculans Ell. & Ev. Specimens determined by J. G. Leach sent from Carlton County, Minnesota; reported as

"Causing most of the leaves to fall. An adjoining field from different seed shows none."

Stemrot caused by Rhizoctonia sp., Washington.

Recent literature:

1. Tennent, R. B. Club-root in turnips. Trials with 'disease resistant' varieties in Otago and Southland. New Zealand Jour. Agr. 30: 259-269. 1925.

2. Whitehead, T. Experiments with 'finger and toe' disease of swedes; with a note on loss caused by rabbits. Welsh. Jour. Agr. 1: 176-184. Jan. 1925.

T U R N I P

Rootknot due to Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb). A specimen was received from Dorchester County, Maryland, where it was reported to be severe in a local area in the field. Boyd reported that in southern Georgia the disease was generally of slight importance, but was observed to be severe in three gardens.

Leafspot caused by Cercosporella albo-maculans (Ell. & Ev.) Sacc. was reported by Boyd to be general on the winter crop in Georgia, causing premature death of leaves.

White rust caused by Albugo candida (Pers.) Kuntze, prevalent in Texas. (Taubenhaus)

Anthracnose caused by Colletotrichum higginsianum Sacc. was reported from South Carolina.

Scab caused by Actinomyces scabies (Thax.) Guess., New Jersey.

Mosaic (undet.) Reported by Gardner from Indiana as, "Serious locally; plants stunted. Ruined an experimental plot of the Horticultural Department at Lafayette. Results of heavy aphis infestation." Also reported from Kansas.

Rot caused by Rhizoctonia sp. was reported from Washington.

Recent literature:

1. Tennent, R. B. Club-root in turnips. Trials with 'disease resistant' varieties in Otago and Southland. New Zealand Jour. Agr. 30: 259-269. April 1925.

2. Wormald, H., and R. V. Harris. Note on the bacterial softrot of turnips. Ann. Appl. Biol. 12: 326-329. July 1925.

DISEASES OF CUCURBITS

MUSKMELON

LEAFBLIGHT CAUSED BY MACROSPORIUM CUCUMERINUM ELL. & ARTH.

Leafblight was reported in 1925 from eleven states, all east of the Mississippi River. All but one (Indiana) reported less than last year and most of them less than in average years. The decreases in the losses from blight were doubtless due to two factors: the low precipitation during the summer of 1925, and the increase in the practice of spraying and dusting.

The estimated losses reported by collaborators are: 25 per cent in southern Georgia, 6 per cent in Texas and Indiana, 3 per cent in Maryland, and a trace to one per cent in New York. In Michigan the disease was said to be very common each year in unsprayed fields, and in 1925 it was important in the western part of the state. In other states blight was considered relatively unimportant. In Maryland the practice of dusting cantaloupes with dehydrated copper sulfate and lime has increased greatly, due to the efforts of extension workers, and has resulted in a striking improvement in quality, coupled with a decrease in losses from this and other diseases.

BACTERIAL WILT CAUSED BY BACILLUS TRACHEIPHILUS EFS.

In 1925 wilt was reported from Connecticut, New York, Maryland, Florida, Ohio, Indiana, Michigan, Iowa, and Kansas. In most of the states it was considered to be relatively unimportant. The largest loss, 7 per cent, was reported from Iowa. Other losses reported were: New York and Indiana, 3 per cent; Maryland, a trace. Reports from Michigan and Ohio are as follows:

> <u>Michigan:</u> Commonly reported on cucumbers and melons wherever grown. Apparently not as serious as last year, but causing considerable loss in many fields. Improved methods of controlling striped beetles are reducing the amount of this disease. (Nelson)
>
> <u>Ohio:</u> The bacterial wilt is probably the most serious disease on cantaloupes this season, and especially in the northwestern part of the state where it is causing serious loss. In some places the loss is as high as 40 per cent of the crop. (H. C. Young)

ANTHRACNOSE CAUSED BY COLLETOTRICHUM LAGENARIUM (PASS.) ELL. & HALS.

Anthracnose was very destructive in Ohio, Michigan, and Iowa (estimated loss 10 per cent) in 1925. Other states from which it was re-

ported are New York (estimated loss a trace), Maryland (estimated loss a trace), southern Georgia (estimated loss 5 per cent), Florida, Wisconsin, and Kansas. Collaborators' reports from Florida, Ohio, and Michigan are as follows:

<u>Florida:</u> Found almost everywhere the host plant is grown in the state, worst in northern part of the state. (Weber)

<u>Ohio:</u> Next to the bacterial wilt, anthracnose is causing serious losses in the melon growing section around Cleveland. It is a disease that has been very common there for the last few years but seems to be more destructive this year, and in some places the crop will be reduced by 20 to 30 per cent. (H.C. Young)

<u>Michigan:</u> Second most important melon disease. Generally reported as blight and very much confused with leaf blight, caused by Macrosporium. More than usual amount of this disease and very important in some fields. Seed borne. (Nelson)

DOWNY MILDEW CAUSED BY PSEUDOPERONOSPORA CUBENSIS (BERK. & CURT.) ROSTEW.

Downy mildew was reported from Delaware, Maryland (estimated loss 1.5 per cent), South Carolina, southern Georgia (estimated loss 1 per cent), Florida, Texas (loss 3 per cent), California (loss 2 per cent), and Porto Rico Delaware, Maryland and south Georgia reported less than last year and less than average years. Other reports from collaborators are:

<u>South Carolina:</u> Found to limited extent throughout trucking district but in no case was severe damage done. (Moore)

<u>Florida:</u> Downy mildew is probably the worst disease in Florida on cantaloupe. It was found wherever the host plant was grown and did considerable damage. (Weber)

<u>California:</u> Downy mildew has been very destructive in the coastal regions of San Diego County for the past four years. Growers and local agricultural authorities state that cantaloupes and watermelons were grown very successfully prior to 1922 without trouble from downy mildew, high quality melons being supplied to local and nearby markets from June until October. In 1922 mildew became generally destructive late in the season; in 1923 it became destructive in August; in 1924 it was first observed on June 23 and soon became general; in 1925 early stages were noted on July 12, and by July 22 many fields showed marked defoliation. Decided reductions in yields have resulted. Even more decided has been reduction in quality and consequent disrepute of local melons, outside of the earliest melons harvested before mildew became destructive. (Jagger)

MOSAIC (UNDETERMINED)

States from which mosaic was reported in 1925 were Connecticut, New York, Delaware, Maryland, Virginia, Kentucky, Indiana, Iowa, and Kansas. In Iowa the loss was estimated at 5 per cent. Other states report it not serious or serious only locally. The following are some of the collaborators' reports on the occurrence and severity of mosaic.

<u>New York:</u> In the Irondequoit - Greece Section a trace to 3 per cent of the plants showed very evident mosaic symptoms; mottled, roughened leaves, and the plants dwarfed and yellowed. In each case the plant was a complete loss. (Chupp)

Mosaic common, 5 per cent or more in a field at Elmira, New York. (Barrus)

<u>Maryland:</u> The most important disease evident was mosaic, which was found in 17 out of 21 fields examined. In general not more than a trace was present, but in one field about 50 per cent, in another 10 per cent, and in two others 1 per cent were affected. In three of the worst fields the relation of pokeweed (Phytolacca) to mosaic of cantaloupe was closely demonstrated, most of the diseased plants being on the sides of the field near the infected pokeweeds. (Jehle, Gilbert, & Haskell)

<u>Kentucky:</u> At Middletown two fields were plowed under because of nearly complete infection with mosaic. Milkweeds were in the woods in the near vicinity. (Gardner)

POWDERY MILDEW CAUSED BY ERYSIPHE CICHORACEARUM DC.

Two serious outbreaks of powdery mildew were reported in 1925, one in southern Georgia and the other in the Imperial Valley of California. It was also reported from Delaware and Florida, but was not considered serious in those states.

<u>Georgia:</u> Powdery mildew entailed more loss outside the commercial fields than any other disease this year, principally to small truck and garden patches of later plantings. In some fields, losses ran as high as 50 per cent. Of little consequence in the earlier large plantings. First noted June 15 on isolated hills in small fields, but by July 1 had spread over wide areas in fields.

Loss, 1 per cent in commercial fields, and about 15 per cent in the garden and truck patches, principally on Rocky Ford. (Boyd)

<u>California:</u> A large acreage of early cantaloupes is grown in the Imperial Valley of California, where the climate is decidedly arid with an average annual rainfall of about 3 inches and a very high percentage of sunshine. Previous to 1925 there had

been no complaints of injury to foliage by the various fungi and bacteria which attack the leaves in moister climates. Powdery mildew appeared in the 1925 crop early in May, when harvesting was about to begin in the earliest fields. Invariably there was no foliage injury and little mildew to be found until melons began to ripen, but in practically every field in the Valley mildew appeared in destructive form at about the time picking began, and developed rapidly thereafter. The older leaves were killed rapidly, resulting in the failure of later set melons to develop, and undoubtedly in reduced quality, especially of fruits picked after the foliage had been much reduced. Local interests are agreed that mildew reduced the total crop of the Valley about 15 per cent. Perithecia of the mildew fungus have not been found, making it impossible to definitely classify it, although Erysiphe cichoracearum DC. is usually indicated on cucurbits. (Jagger)

OTHER DISEASES

Heterodera radicicola (Greef)Muell. (Caconema radicicola (Greef) Cobb), rootknot, was reported by Boyd as "Quite important in both the commercial fields and small gardens in the coastal plain area of southern Georgia; caused a loss of 10 per cent." It was also reported from Florida, Texas, Oklahoma, and Missouri where it is reported to be serious in local areas.

Fusarium sp., wilt. Much injury was reported in a few fields in Monroe and Niagara Counties, New York, by Chupp who states that "Infected plants at first are yellow and stunted, later wilt and die. Brown vascular bundles."

Cercospora cucurbitae Ell. & Ev., leafspot. Georgia, Porto Rico.

Cladosporium cucumerinum Ell. & Arth., scab. Reported from the Irondequoit and Schenectady districts in New York.

Phyllosticta sp., leafspot, was reported from southern Georgia.

Sclerotium rolfsii Sacc., stemrot, Texas, stemrot and fruitrot, Georgia.

Septoria cucurbitacearum Sacc., leafspot, was collected in Michigan by C. W. Bennett.

Bacterial leafspot (undet.). Reported from Georgia.

Bordeaux spray injury was reported from Connecticut, but was of little importance.

C U C U M B E R

BACTERIAL WILT CAUSED BY BACILLUS TRACHEIPHILUS EFS.

In 1925 bacterial wilt was reported from seventeen states east of the Great Plains. The largest losses reported were 20 per cent from Kentucky and 10 per cent from West Virginia. Other estimated losses were, Iowa 5 per cent,

New York 3 per cent, and Texas one-half per cent.

New York: In a demonstration at Ithaca on wilt control, 12 plats were planted, so that there were four replications.

1. Dusted 6 times: Copper-lime lead-arsenate dust. Yield 261.75 pounds.
2. Dusted 6 times: 3 times with nicotine dust, 3 with copper-lime lead-arsenate. Yield 213.50 pounds.
3. Check, no treatment: Yield 190.50 pounds.

The check plats that had no wilt yielded as well as the dusted, but the wilt in two check plats reduced the yield very much. (Chupp)

Kentucky: July 2 and 3 I visited several fields of cucumbers near Harned in Breckenridge County. In the early plantings close to 20 per cent of the plants were already infected with wilt. Many plants had already died. Three per cent nicotine dust had been used, but was put on at weekly intervals. (Valleau)

Ohio: It is difficult to find a planting of cucurbits where there is not some evidence of the bacterial wilt disease. Contrary to usual symptoms, this disease does not appear to be started by infection of the stem at the surface of the ground. The number of leaf infections noted this season has been large compared with other seasons. It may be safely estimated that 90 per cent of the cucumber plantings in northern Ohio show varying amounts of the bacterial wilt trouble. (Report of Plant Pathologists, Ohio Agr. Exp. Sta. for Northern Ohio, August, 1925.)

Michigan: Our early predictions as to the occurrence of wilt were not borne out due to onset of unfavorable conditions for striped beetles. Less important than for several years. (Nelson)

ANGULAR LEAFSPOT CAUSED BY BACTERIUM LACHRYMANS EFS. & BRYAN

Angular leafspot was reported from New York, Delaware, Georgia, Florida, Michigan, and Wisconsin in 1925. In New York it was again reported from Monroe County. Last year was the first time it was observed in that state outside of the Long Island section.

Delaware: Most important leaf disease. (Adams)

Florida: This disease was not as prevalent during the past season as the year before. It was important, however, in the Williston section where it did considerable damage. (Weber)

Michigan: Caused considerable alarm early in the season, but was not generally important. Some fields grown for seed were badly diseased. Seed treatment reported ineffective. (Nelson)

Wisconsin: More than for several years. (Vaughan)

ANTHRACNOSE CAUSED BY COLLETOTRICHUM LAGENARIUM (PASS.) ELL. & HALS.

Anthracnose was reported from New York, Delaware, Maryland, Georgia, Florida, Mississippi, Indiana, and Iowa. No serious injury was reported.

MOSAIC (UNDETERMINED)

Judging from reports of collaborators, mosaic was one of the most important cucumber diseases in 1925. It was reported from Massachusetts, Connecticut, New York, New Jersey, Maryland, Virginia, Indiana, Michigan, Wisconsin, Iowa, and Kansas. In New York the loss from mosaic on Long Island is estimated at 65 per cent.

In a survey conducted by Doctors Jehle, Gilbert, and Haskell a number of cucumber and cantaloupe fields on the eastern shore of Maryland were inspected. In a field of cucumbers in Wicomico County practically every plant had been attacked by mosaic. It was noted that the most severely infected plants were all located in the part of the field adjoining a piece of woodland and that the infection was least severe in the portion of the field farthest away from the wood lot. In the wood lot several large pokeweeds (Phytolacca) severely infected with mosaic were found not far from the most severely infected cucumber plants. It seems reasonable to conclude that the mosaic was transmitted to the cucumber plants by means of insects from the infected pokeweeds and was then disseminated throughout the field.

According to Nelson, "Mosaic has assumed serious proportions as a destructive disease in the pickling crop" in Michigan. He states that "Pickle companies report very serious losses this year and the disease is yearly on the increase." The losses are estimated by him at 20 to 40 per cent.

The potential importance of perennial species of Physalis as a means of overwintering cucurbit mosaic has been demonstrated by Walker (6). He reports that a mosaic infection found to be common on and overwintering in P. subglabrata and P. heterophylla in the vicinity of cucumber fields is communicable to cucumber, by means of the cucumber aphis, and also to P. pubescens, an annual species; also that the mosaics of cucumber and P. pubescens are readily intertransmissible by means of the cucumber aphis; and that the mosaic diseases of pokeweed, tobacco, and tomato can be transmitted to P. pubescens.

Doolittle and Walker (1) report that the wild cucumber (Micrampelis lobata) is apparently an important factor in overwintering mosaic in the cucumber growing sections of Wisconsin and Illinois, due to seed transmission, which had been demonstrated previously by Doolittle and Gilbert (2). Other plants which have been found to be susceptible to cucurbit mosaic and to carry infection through the winter in their roots are milkweed (Asclepias syriaca), pokeweed (Phytolacca decandra), catnip (Nepeta cataria), and certain perennial species of Physalis. Martynia louisiana, pigweed (Amaranthus retroflexus), and pepper (Capsicum annuum) were inoculated successfully with virus from mosaic cucumbers. Pepper plants were infected with tobacco mosaic and the disease then transmitted to either tobacco or cucumbers, and the

reverse inoculation was also successful, indicating that the viruses of tobacco and cucurbit mosaics are intertransmissible. Among the Cucurbitaceae all species tested proved to be susceptible to cucurbit mosaic except those of the genus Citrullus.

Elmer (3) reports successful transmission of mosaic from cucumber to tobacco, petunia, and Vigna sinensis, and to cucumber from celery and Euphorbia preslii.

Recent literature:

1. Doolittle, S. P., and M. N. Walker. Further studies on overwintering and dissemination of cucurbit mosaic. Jour. Agr. Res. 31: 1-58. July 1, 1925.

2. ------------, and W. W. Gilbert. Seed transmission of cucurbit mosaic by the wild cucumber. Phytopath. 9: 326-327. Aug. 1919.

3. Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 39-91. 1925.

4. Hansen, A. A. Controlling diseases by destroying weeds. Better crops. 4 (4): 22-23, 28-29. June 1925.
Eradication of milkweed, pokeroot, and wild cucumbers.

5. Leach, J. G. Cucumber mosaic. Minn. Hort. 53: 177-179. June 1925.

6. Walker, M. N. The relation of certain species of Physalis to the overwintering of the mosaic disease of cucumber. Phytopath. 15: 733-744. Dec. 1925.

DOWNY MILDEW CAUSED BY PSEUDOPERONOSPORA CUBENSIS (BERK. & CURT.) ROSTEW.

In 1925 downy mildew was reported from six states along the Atlantic seaboard from Massachusetts to Florida, and from Louisiana and Porto Rico. The largest losses are reported from Florida and southern Georgia. Weber states that in Florida this disease was by far the most important found on cucumbers. It was the limiting factor on the picking season, although not as serious as last year, and it caused a loss of 10 to 15 per cent. It kills the host plant wherever or whenever it grows in the state. In southern Georgia Boyd estimated the loss at 5 per cent and reported the disease to be generally slight, but causing heavy losses in some late fields.

SCAB CAUSED BY CLADOSPORIUM CUCUMERINUM ELL. & ARTH.

Scab was reported only from Maine, New York, Michigan, and Wisconsin, but they all report it to be more destructive than usual. The following loss estimates were given: Michigan, 5 to 10 per cent; Wisconsin, 2 per cent; New York, a trace to 2 per cent.

Maine: Disease apparently much worse than usual. (Folsom)

Michigan: Scab was very troublesome this year, especially on late crop. Salting stations had to refuse to accept quite a large proportion of the crop in some sections. (Nelson)

New York: Occurs both in the greenhouses and outdoors. Seems to be increasing in amount. (Chupp)

Wisconsin: More reports than ever before. One man writes of losing 100 acres in Outagamie County. Cucumbers about village gardens badly diseased in Trempealeau County. We need more research on this disease. (Vaughan)

OTHER DISEASES

Erysiphe cichoracearum DC., powdery mildew, was noted in greenhouses in Massachusetts and Virginia, and was reported also from Delaware, southern Georgia, and Washington. Regarding its occurrence in southern Georgia Boyd states, "It appeared late in the season (June 18) and blighted the foliage after the bulk of the crop was marketed. As much as 5 to 10 per cent loss in a few late fields and gardens. Estimated loss for the state 2 per cent."

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb), rootknot, was reported from New York (greenhouse), southern Georgia, and Texas. Boyd estimated a loss of 10 per cent in southern Georgia where there was a rapid development of the disease after the break in the drought about June 15. The estimated loss in Texas was one per cent.

Alternaria sp., leafspot, was reported from South Carolina by Moore, who said one field was noted in Chesterfield where the foliage was seriously damaged. Not general.

Cercospora sp., leafspot. Southern Georgia.

Cercospora cucurbitae Ell. & Ev. (C. citrullina Cke.), leafspot. Collected in Florida after the picking season on cucumbers grown under glass, not important. (Weber)

Fusarium niveum EFS., wilt, Regarding Fusarium wilt in Florida Weber says, "Reported to be doing some damage to the host plant growing under glass. Not common."

Macrosporium cucumerinum Ell. & Ev., leafblight, was reported from southern Georgia and Maryland.

Phyllosticta cucurbitacearum Sacc., leafspot, was reported from Delaware by Adams, who said "First observation. Trace of infection found only in one field."

Pythium sp., fruit rot. Southern Georgia.

Pythium aphanidermatum (Edson) Fitz., causing cottony leak, is reported by Drechsler (1) as having been found in cucumber shipments originating in North Carolina and South Carolina.

Sclerotinia sclerotiorum (Lib.) Mass., stemrot. New York and Washington in greenhouses; fruit rot (2) southern Georgia.

Sclerotium rolfsii Sacc., ground rot. Reported from southern Georgia.

Bacterial leafspot. A bacterial leafspot (undet.) was reported from southern Georgia.

Recent literature:

1. Drechsler, C. The cottony leak of cucumbers caused by Pythium

aphanidermatum. Jour. Agr. Res. 30: 1035-1042. June 1, 1925.

2. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

P U M P K I N

Fruit rot caused by Alternaria sp. was reported from Washington.

Bacterial wilt caused by Bacillus tracheiphilus EFS. was reported from Lawrence County, Illinois.

Powdery mildew probably Erysiphe cichoracearum DC. was reported from Oregon.

Black rot caused by Mycosphaerella citrullina (C. O. Sm.) Gross. was reported from Michigan. Nelson stated that "One 80-acre field was reported a total loss."

S Q U A S H A N D S U M M E R S Q U A S H

Powdery mildew caused by Erysiphe cichoracearum DC. was reported from Connecticut, New Jersey (on Hubbard and Italian squash; generally distributed); southern Georgia (little, except on some late plantings, loss 5 per cent), Florida (found well scattered over the state, but doing little damage), Oregon (on Boston Marrow, local in western part of state.).

Angular leafspot caused by Bacterium cucurbitae Bryan, was found on Hubbard squash in one garden in Tompkins County, New York. The disease resembled very strongly the angular leafspot of cucumbers, but according to Miss Bryan it is due to a different organism which she has named Bacterium cucurbitae (1).

Mosaic (undet.) was reported from Florida on Cucurbita pepo and C. moschata. Weber stated that it was very common and caused total loss in some fields of the former species. In Arizona, according to Streets, the disease is probably more general and destructive than is realized. He estimated a loss of 5 per cent. Mosaic was reported from Louisiana and Texas.

Elmer (2) reports successful infection of tobacco, petunia, tomato, and cowpea with virus from summer crookneck squash (Cucurbita pepo condensa) plants affected with mosaic; and of the squash with virus from mosaic tobacco and tomato plants.

Downy mildew caused by Pseudoperonospora cubensis (Berk. & Curt.) Rostow, was said by Weber to be common and the cause of considerable loss on summer squash in Florida.

Anthracnose caused by Glomerella sp. According to Ocfemia and Agati (3) a Glomerella attacks the stems, leaves and fruit of the white squash (Cucurbita pepo) in the Philippines. It is very similar to, if not identical with

Glomerella cingulata causing anthracnose of avocado and mango, and is capable of infecting those hosts. It is a serious disease in the Philippines.

Bacterial wilt caused by Bacillus tracheiphilus EFS. was reported from Connecticut, New York (on Cucurbita maxima), and Delaware (on summer squash), A specimen was received from Indiana.

Rootknot caused by Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb), was general in the Coastal Plain of southern Georgia where it caused a loss estimated by Boyd at 10 per cent. It was also reported from Texas.

Blossom rot caused by Choanephora cucurbitarum (Berk. & Rav.) Thax. was reported as occurring on summer squash in Delaware and Florida.

Wilt caused by Fusarium sp. was reported from Delaware and Texas.

Timber rot caused by Sclerotinia sclerotiorum (Lib.) Mass. was reported from New York (on Cucurbita maxima; rare).

Rots caused by Aspergillus sp., Botrytis cinerea Pers., and Rhizopus nigricans Ehr. were reported from Washington.

Soft rot (undet.) was reported to be common on cymblings in the Norfolk region of Virginia by McWhorter.

Recent literature:

1. Bryan, Mary K. Bacterial leafspot on Hubbard squash. Science n.s. 63: 165. Feb. 5, 1926.

2. Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 39-91. 1925.

3. Ocfemia, G. O., and J. A. Agati. The cause of the anthracnose of avocado, mango, and upo in the Philippine Islands. Philipp. Agr. 14: 199-216. Sept. 1925.

W A T E R M E L O N

ANTHRACNOSE CAUSED BY COLLETOTRICHUM LAGENARIUM (PASS.) ELL. & HALS.

Anthracnose was the most destructive watermelon disease in 1925. Serious losses were reported from Iowa, southern Georgia, Florida, and Mississippi. Other states reporting it were New York, New Jersey, Delaware, Maryland, South Carolina, Louisiana, Ohio, Indiana, Kansas, and Porto Rico. The following are some of the loss estimates for 1925: Iowa 20 per cent, southern Georgia 10 per cent, Maryland 8 per cent, Indiana 2 per cent.

Georgia (southern): Although the temperature was favorable for development, moisture relationships were not favorable for epidemics; also although pox was plentiful on melons entering cars, moisture conditions during transit apparently were not conducive to anthracnose rot, for there was much less transit rot than usual. (Boyd)

Florida: The worst disease of the host in the state. It was common over the state and was about as abundant and serious as last year. (Weber)

Mississippi: Several reports this season. Serious damage in many cases. Evidently the disease is being imported and spread largely in the seed. (Neal)

Ohio: Considerable loss in the state from the anthracnose disease. It seems to be increasing from year to year. (Young)

Kansas: By far fewer reports this year than ever before. (White)

Recent literature:

1. Boyd, O. C. Spraying and dusting watermelons for anthracnose control. Proc. & Min. Melon Distr. Assoc. Ann. Meet. 11 (1925): 30-33. 1925.

FUSARIUM WILT CAUSED BY FUSARIUM NIVEUM EFS.

Fusarium wilt was reported from New Jersey, Maryland, South Carolina, Georgia, Florida, Mississippi, Texas, Indiana, Iowa, Missouri, Kansas, Arizona, Oregon, and California. The following losses were reported in 1925 - Kansas 5 per cent, California 2 per cent, southern Georgia one percent, Maryland a trace.

Georgia (southern): General in Coastal Plain, but most prevalent in southern counties. In infested soil, it developed in spite of drought; temperature favorable. (Boyd)

Florida: Bad in localities or on land where crop was not rotated. Generally distributed, about as much as last year. (Weber)

Mississippi: The disease was very prevalent in various parts of the state during July and August, causing serious damage in Lee, Choctaw, Lauderdale, and Attala Counties. (Neal)

Oregon: One field of 50 or 60 acres on Grand Island (in the Willamette River near Dayton) showed wilt due to *Fusarium* sp. varying from 50 per cent in spots to none in other parts. It was on newly cleared land, which lay below the melon fields of 1923, and flood water drained over it. The wilt was worse in the places where flood water stood in the winter. There is a good deal of land in western Oregon suitable for melon growing, and there would be a much larger acreage if it were not for wilt. The varieties that have been developed as resistant in the East have not, on trial, proved to be so here. No control has been developed. Growers believe hill lands are safer and some are going to grow melons there as a trial. (McKay)

GUMMY STEMBLIGHT CAUSED BY MYCOSPHAERELLA CITRULLINA (C. O. SM.) GROSS.

Gummy stemblight was reported from Georgia, Florida, and Porto Rico. The following reports were received from Georgia and Florida.

Georgia: First observed May 25 in the station field. Generally less common than in 1924. Most prominent where melons were planted one to 2 years after melons. Highest percentage infection, 10 per cent with a loss of 2 per cent of the hills before shipping season was half over (5-acre field, Thomas County). Estimated loss, one-half per cent. (Boyd)

Florida: Frequently found during the past season girdling and killing bearing vines. (Weber)

OTHER DISEASES

Blossom-end rot. In southern Georgia the estimated loss from blossom-end rot was 10 per cent. According to Boyd the dry weather with heavy dews promoted the rot and the temperature was favorable. In Iowa and Texas the loss from this disease was estimated at 2 per cent. It was also reported from Virginia.

Heterodera radicicola (Greef) Muell. (*Caconema radicicola* (Greef) Cobb) rootknot. Boyd reported that in southern Georgia, "Rootknot is general in the Coastal Plain but worse in the southernmost counties. It was important only in fields on old land. Loss 5 per cent." Taubenhaus reported a loss of one-half to one per cent in Texas.

Cercospora cucurbitae Ell. & Ev. (*C. citrullina* Cke.), leafspot, was reported from southern Georgia, Florida, and Texas.

Erysiphe cichoracearum DC., powdery mildew. Georgia.

Diplodia sp., stem-end rot. Maryland, southern Georgia, Louisiana, Texas.

Macrosporium cucumerinum Ell. & Ev., leaf blight. Virginia, Georgia, and Florida.

Phyllosticta cucurbitacearum Sacc., leafspot. Georgia.

Pseudoperonospora cubensis (Berk. & Curt.) Rostew., downy mildew. Louisiana, infection light as a rule, but considerable injury to some late plants, according to Edgerton.

Rhizoctonia sp. A Rhizoctonia stemrot of seedling was reported from Georgia.

Sclerotium rolfsii Sacc. In Georgia the estimated loss from fruitrot was one per cent. Stemrot was reported as common in Florida.

Mosaic (undet.) Collaborators in Virginia, Indiana, and Texas reported a mosaic-like trouble. Workers with cucurbit mosaic have not been able to obtain infection of species of Citrullus. (See cucumber)

Recent literature:

1. Anon. Prevent stem-end rot of melons in transit. Citrus Indust. 6 (6): 14. June 1925.

2. Gilbert, W. W., and Ernst Artschwager. Watermelon internal browning. Phytopath. 15: 119-121. 1925.

3. ----------, and F. C. Meier. Chemical injury to watermelons in transit. (Abstract) Phytopath. 16: 73. Jan. 1926.

4. Ramsey, G. B. Fumigation injury of watermelons. Phytopath. 15: 479-481. 1925.

DISEASES OF CELERY

BACTERIAL BLIGHT CAUSED BY BACTERIUM APII JAGGER

Bacterial blight was reported from New York (estimated loss 2 to 3 per cent), Ohio, Michigan (estimated loss 2 to 5 per cent), and Minnesota. In Michigan Nelson reported, "Bacterial blight was generally present in all fields in Kalamazoo and destructive in the second crop. It was more important than Septoria except at Kalamazoo and Muskegon." Chupp reported that in New York, "It is of minor importance where control measures are exercised. Good control was obtained with copper-lime dust and Bordeaux. Most of the infected fields outgrew the trouble and it was not severe after August 15."

EARLY BLIGHT CAUSED BY CERCOSPORA APII FRESENIUS

Early blight was reported from New Hampshire, Connecticut, New York, New Jersey, Delaware, Florida, Texas, Indiana, Michigan, Missouri, Nebraska, and California in 1925. In most of the states it was considered to be relatively unimportant, but a loss of one to 5 per cent was reported from Michigan and one per cent from California. In Connecticut there was more than usual and together with late blight it caused much injury. In Florida it still remains the most common disease of celery, according to Weber, and commercial control was obtained by spraying, while unsprayed plants were a total loss. In Michigan, Nelson stated "Generally found everywhere but important only in the second crop in the Kalamazoo district. It was not well controlled by dusting but spraying was effective."

YELLOWS CAUSED BY FUSARIUM SP.

New York, Ohio, Indiana, Michigan, Minnesota, and Colorado reported yellows in 1925. In New York it seems to be increasing in importance, according to Chupp, who estimated the loss at a trace to 2 per cent. Some of the other reports received are as follows:

Indiana: Not serious. Growers near Goshen and Lafayette use resistant varieties. Seed from Coons and Nelson, Michigan, proved resistant. (Gregory)

Michigan: Of minor importance. The general use of strains originating from crosses with "green" varieties has largely eliminated yellows as a factor in the production of celery in the infested areas. (Nelson)

Minnesota: Observed in one field near St. Paul. One spot which is increasing in size each year. (Sect. Plant Path.)

LATE BLIGHT CAUSED BY SEPTORIA APII ROSTR.

Late blight was one of the most serious diseases of celery in 1925. It was reported from the following states: New Hampshire, Massachusetts, Connecticut, New York, New Jersey, Florida, Ohio, Indiana, Michigan, Wisconsin, Minnesota, Colorado, California, and Porto Rico. Losses reported were 10 to 15 per cent in Michigan, 10 per cent in New York, and 2 per cent in California. Bisby stated that it caused some injury in Manitoba, Canada.

Massachusetts: Has appeared both in the seed bed and the field in Amherst. The field infection undoubtedly came from the seedbed on early celery and appears to be rather serious. So far as we have record, this - May 16 - seems to be the earliest appearance of this disease reported in Massachusetts. (Osmun)

Connecticut: Considerably more than the average year and the worst seen for several years. With a good start and considerable injury, the cold weather of October slowed up the spread very considerably. Injury runs all the way from slight to 40 per cent according to variety and field. (Clinton)

New York: Where seedbeds were dusted with copper lime dust three times, the disease was much more easily held in check after the plants were transplanted. Much early celery escaped blight, harvested early. (Chupp)

New Jersey: Not a serious trouble on properly sprayed plants. (Dept. Plant Path.)

Florida: More plentiful than last year in the state at large with probably less in the Sanford section. (Weber)

Michigan: Fifty per cent loss in late crop in Kalamazoo district; 25 per cent in Muskegon district. Elsewhere, in one-crop sections, controlled by spraying and dusting. (Nelson)

Wisconsin: More than usual. Many plants had one-third of the outer leaves destroyed. Hearts were sold just the same, growers considered it of little damage. (Vaughan)

Minnesota: Several severe outbreaks in some fields planted from a lot of seed known to be badly infected. Other fields comparatively free. (Sect. Plant Path.)

California: Occurred considerably in central California. This is unusual. (Milbrath)

OTHER DISEASES

Bacillus carotovorus Jones, slimy rot. Connecticut, Minnesota, Iowa, and Colorado. In Minnesota the Section of Plant Pathology reported,

"Severe outbreaks in some fields; one field of one-fourth acre a total loss. Worse in dry hot weather. Worse on some plants differing only in date of planting. Seems to be correlated with lack of rains and age of plants at critical time. Evidence of insect transmission."

Corticium vagum Berk. & Curt., rootrot. Chupp reported this from New York as follows:

"At South Lima, Livingston County, a muck field which later was planted to celery, was in part heavily mulched with old, decaying potatoes from the storage house. After the celery grew to be about ten inches tall, the Corticium stage of Rhizoctonia fruited over the entire surface of many of the plants grown in the mulched area. The cuticle slipped off the covered parts of the stem and some of the stem tissue turned brown.

"It is not known whether the Corticium was originally in the soil or whether the sclerotia on the decaying tubers could have been the cause of the trouble."

Sclerotinia sclerotiorum (Lib.) Mass. (2), pink rot. New York, Florida, Washington, California. In New York it was mostly a rot in storage. In Florida it was one of the worst diseases of celery, taking heavy toll in the fields before harvest time and also in transit. In California foot rot due to this organism caused a loss of one-half per cent, according to Milbrath.

Heterodera radicicola (Greef) Muell. rootknot. Florida, "More serious during the fall in seedbeds than last year." (Weber)

Blackheart (non-par.). California.

Crown rot (undet.). Reported from New York. A bacterium was isolated from material sent to Chupp.

A burning off and water injury were reported from New York. The burning off was due to excess heat from the sun and the water injury to excess rain and poor drainage. The latter produced blackened and water-soaked stems and was serious in Wayne County. The former was serious in many seedbeds.

Mosaic (undet.) was reported from New York, Ohio, Iowa, California. Elmer (1) obtained infection of tomato, tobacco, and cucumber with celery mosaic.

Recent literature:

1. Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res Bul. 82: 39-91. 1925.

2. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

DISEASES OF LETTUCE

DROP CAUSED BY SCLEROTINIA SCLEROTIORUM (LIB.) MASS. AND S. MINOR JAGGER

Sclerotinia sclerotiorum occurred in greenhouses in Massachusetts and Indiana, and in New York it was most important in greenhouses but was also found in the field. Chupp estimated a loss of 5 per cent. Other states reporting its occurrence in the field are Connecticut, Virginia, Florida, Louisiana, Washington, and Oregon. In Louisiana and western Oregon the disease was said to be serious locally. Weber reported that in Florida, "Drop was probably not so prevalent and serious during the past season as the year before. Nevertheless it still remains foremost in importance of lettuce diseases, causing as much loss as all others combined." In California, according to Milbrath, the disease was present throughout the state, except in the Imperial Valley, and caused a loss estimated at one-half per cent.

Sclerotinia minor was reported from western Oregon as important where it occurred, and from New Jersey as very severe in some fields.

Recent literature:

1. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

DOWNY MILDEW CAUSED BY BREMIA LACTUCAE REGEL

Downy mildew was reported from New York, South Carolina, Florida, Indiana, Iowa, Washington, and California, and in most cases considered relatively unimportant. In New York it developed into a storage and transit rot; in Florida it was common but seldom destructive; in Indiana and Iowa it occurred in greenhouses. In California there was considerable outside of the Imperial Valley, in all the coastal regions and northern valleys, and it caused a loss of 2 per cent, according to Milbrath.

GRAYMOLD CAUSED BY BOTRYTIS SP.

Massachusetts, Connecticut, New York, New Jersey, Virginia, and Iowa reported graymold in 1925. In Massachusetts and Iowa it occurred in greenhouses; in New York it was statewide and caused a loss estimated by Chupp at a

trace to one per cent; in New Jersey it was said to be important in some coldframes, and preliminary tests indicated that it could be controlled by organic mercury compounds.

BOTTOM-ROT CAUSED BY CORTICIUM VAGUM BERK. & CURT.

Bottom-rot, always an important disease in New York, caused a loss of 15 to 20 per cent in 1925, according to Chupp and Felix. It was also reported from Connecticut. White reported a rootrot from Kansas as follows, "One case only has come to my attention this year. The cause is probably Rhizoctonia sp. since this organism has been associated with a field root-rot in previous years in this state. No specimens accompanied the report, however."

TIPBURN (NONPAR.)

Tipburn seemed to have been especially destructive in some of the Atlantic Coast states in 1925. Chupp and Felix reported that it was general and serious in New York and caused a loss estimated by them at 15 per cent. Internal tipburn was prevalent. In one field of 10 acres observed in New Jersey every plant was ruined by tipburn, according to the Department of Plant Pathology. In that state the disease was said to be most severe in the southern part. McWhorter reported from the Eastern Shore of Virginia in the spring of 1925 that, "There is a very large amount of tipburn in the Newport News and Portsmouth lettuce sections. The disease is apparently worse in sections where a great deal of crab-scrap fertilizer was used. It appeared after several warm days in the spring." Boyd stated that tipburn was very common throughout southern Georgia on both leaf and head lettuce during April and May, and quite destructive in some gardens and fields.

In the western states, the disease was said to be unimportant in Idaho; on the other hand, tipburn, followed by slimy rot, was of some importance in Oregon; while in California, Milbrath reported a loss of 3 per cent.

BACTERIAL DISEASES

Leafspot caused by Bacterium marginale Brown (?), reported in one field in Wayne County, New York, in July; 50 per cent infection. (J. G. Gaines)

Rot caused by Bacterium viridilividum Brown, apparently following tipburn, was reported by McWhorter from the Eastern Shore of Virginia.

Wilt caused by Bacterium vitians Brown was reported from New York.

Bacterial stem girdle (undet.). Felix reported this from New York as follows: "More than last year. Occurred in Genesee, Orleans, Oswego, and Wayne Counties, and possibly wherever lettuce is grown. Infection begins at the surface of the ground and works downward."

A leafspot, undetermined but apparently bacterial, was reported by Felix from Genesee and Orleans Counties, New York. All varieties were attacked, but Dye's hybrid 26-19-10 (Big Boston x Cos) was unusually susceptible.

An undetermined bacterial leaf spotting, wilting, and yellowing was reported from San Miguel and Dona Ana Counties, New Mexico.

Bacterial softrot. Rotting off of the plants at crown in Iceberg variety was reported from Connecticut. Softrot was also reported from Oregon, (following tipburn), Washington, and Idaho. Arizona reported a bacterial slime as follows:

> "Lettuce slime has developed in many of the late plantings throughout the Salt River Valley. This disease evidently was associated with the high temperatures prevalent for several days. Some fields were so badly diseased that shipment was out of the question although much could be used for local consumption." (The Arizona News Letter, State Com. Agr. & Hort. 3: 7. April 30, 1925.)

MOSAIC (UNDETERMINED)

In New York there was more mosaic than last year and more than average, the loss being estimated at 15 per cent by Chupp and Felix. They state that mosaic is carried in the seed and spreads later, also that the growers believe it is becoming more serious only since large quantities of seed have been obtained from California. The Survey has no record of the occurrence of lettuce mosaic in California, but it very likely is present in that state. It has been found causing considerable damage in the lettuce section of Florida, especially during the past season or two. In New Mexico more than last year, and more than the average amount was reported, with an estimated loss of 2 per cent

RIO GRANDE DISEASE (UNDETERMINED)

Rio Grande disease is considered one of the most important diseasesof lettuce in western New York, where it is known as white heart. The loss for 1925 is estimated by Chupp and Felix at 10 per cent. They state that the disease is present on both muck and upland soil, and occurs under so many different environmental conditions that it is believed not to be a physiological trouble. Traces are reported from the Rio Grande Valley of Texas. McWhorter, in Virginia, again reported a rosette-like disease, probably the initial stages of the one which he tentatively called the "Newport News rosette" in 1924, but which was said to resemble the Rio Grande disease.

BROWN BLIGHT (UNDETERMINED)

This new lettuce disease is described by Jagger from California and Arizona as follows:

> "Brown blight is a new disease of lettuce, apparently caused by a soil organism, which, however, has so far not been fully identified. When attacked while small the plants become much stunted, show yellow to brown discoloration, and gradually

die; when attacked after headed the wrapper leaves and the outer leaves of the head show irregular dry dead brown streaks and blotches. It is destructive in the Imperial Valley of California and is known to occur in several localities in Arizona. In the Imperial Valley it occurs in all fields but usually becomes destructive only after one to three crops of lettuce have been grown. The disease is not materially reduced by growing other crops on infested land for one to four years, notwithstanding the fact that only lettuce seems to be affected. Probably the average loss for the Valley for the past 3 or 4 years has been somewhere between 1 and 5 per cent, and the best lettuce land is rapidly becoming infested beyond possibility of growing satisfactory crops for many years. The writer is making rapid progress in developing highly resistant strains of the New York variety (known to the consumer as Iceberg), which is grown almost exclusively in Pacific Coast and Rocky Mountain regions. Incidentally the Big Boston variety, which is the standard shipping variety in the South and East, seems to be entirely immune."

OTHER DISEASES

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb), rootknot. Reported in greenhouses in New York, Arkansas, and Indiana. A 5 to 10 per cent infection was observed in one field in New Jersey. In Georgia it was common in home gardens but less destructive than in 1924.

Sclerotium rolfsii Sacc., damping off was reported as moderate to severe in the Coastal Plain area of South Carolina where truck crops, especially lettuce, have been grown continuously, and causing a loss estimated at 15 per cent.

Cercospora lactucae Stevenson, leafspot, Porto Rico.

Macrosporium sp., blight, was reported as occurring to a slight extent in New York, causing a loss estimated at one per cent.

Marssonina panattoniana (Berl.) Magn., anthracnose, general in Florida.

Ozonium omnivorum Shear, rootrot, was said to be prevalent in overgrown lettuce in Texas.

Septoria lactucae Pass, leafspot. New York.

Chlorosis due to excess of lime, Texas.

Rootrot (undet.). Considerable in some fields in New York and more prevalent than last year, according to Felix.

Stunt (undet.) was found, mostly on Cos lettuce, on 18 farms visited in New York, infection ranging from a trace to 2 per cent. Chupp states that Felix thinks this is bacterial in nature, instead of being due to a Pythium.

Stunting of plants on unproductive muck, involving several hundred acres, was reported from New York, where it occurred in Genesee, Orleans, and Oswego Counties, and probably others also, according to Felix. The plants were stunted and had a "rabbit ear" appearance. Felix stated that "Small applications of copper to the soil or to the leaves of affected plants corrected the unproductivity. Onions and rutabagas are also very sensitive to the trouble; while potatoes and certain other crops do well without treatment. This type of unproductivity is distinct from that caused by toxic elm wood. (See onion)."

Stunting due to soluble salt injury was of statewide occurrence in greenhouses in Indiana, according to Gregory.

Recent literature:

1. McWhorter, Frank P. Cercospora leaf spot of lettuce. Phytopath. 15: 247. 1925.

DISEASES OF PEA

ROOTROTS DUE TO VARIOUS ORGANISMS

Rootrot caused by Aphanomyces euteiches Drechsler

Aphanomyces rootrot was reported from New York, New Jersey, Delaware, Maryland, and Wisconsin. Except in Maryland and locally in Wisconsin it was apparently less prevalent and of minor importance in 1925. Losses reported were 10 per cent in Maryland, and 2 per cent in New Jersey and Wisconsin. Haenseler reported from New Jersey "In greenhouse tests, Canada field peas proved to be very susceptible and winter vetch slightly so." According to Jones and Drechsler (6, p. 294), "Although it seems unlikely that this fungus is parasitic only on peas, a search for other host plants has thus far been in vain."

Rootrot caused by Fusarium spp.

Fusarium rootrot was reported from New York, Maryland, and Georgia. Fusarium martii pisi Jones, according to Thomas (July 1), was important both in home gardens and commercial fields in Ohio.

Wilt caused by Fusarium sp. (undet.)

A wilt due probably to an undetermined species of Fusarium was stated by Linford (8) and by Jones and Linford (7) to be second in importance only to Aphanomyces rootrot in Wisconsin. The loss estimated in 1925 - 4 per cent - was greater than that reported for Aphanomyces. Vaughan stated that it was of major importance in the central section of the state. One canning variety, Green Admiral, and certain newer varieties show a high degree of resistance, according to Linford (8).

Seedling rot and rootrot caused by Pythium spp.

Pythium sp. causing seed and seedling rot was reported by Haenseler as less prevalent than usual and unimportant in New Jersey. The weather during the planting period was cold and rather dry. Damping-off was very serious locally in South Carolina, according to Fenner.

Jones and Linford (7) reported that although in the pea disease survey of Wisconsin in 1924 species of Pythium were found to be present in abundance

in some soils, no instance of important injury from these fungi was recorded, due probably to the fact that comparatively high soil temperatures are necessary for their activity.

Jones and Drechsler (6, pp. 294-297) state that:

> " . . . . although it appears generally true that beets grow well on old pea fields and vice versa, experience is reported otherwise in the Salt Lake Valley, Utah. It may be of interest to note in this connection that in the course of making isolation from diseased peas from this valley with the writer, John W. Carlson, of the Utah Experiment Station, obtained among other fungi a culture of Pythium (Rheosporangium) aphanidermatum (Edson) Fitzpatrick, one of the well-known sugar-beet parasites. This is one of the species of Pythium which the writer has found capable of producing root rot of peas, and if it is widely distributed in this valley it may be the common parasite of these plants which renders pea growing on old beet field unprofitable."

Rootrot caused by Corticium vagum Berk. & Curt.

Rhizoctonia rootrot was reported from Massachusetts and Virginia, as follows:

Massachusetts: Found characteristic mycelium of Rhizoctonia, also cultured it, but could not find Aphanomyces sp. (Davis, July)

Rootrot, Rhizoctonia (?), serious throughout the state. In some sections growing of the crop has been abandoned because of inability to control this disease. (Osmun & Davis, Aug. 1).

Virginia: This disease is fast becoming the most serious trouble of fungous cause found on peas in eastern Virginia. It greatly reduces the stand. The writer's field notes indicate that it is most serious on potato land. (McWhorter)

Jones and Linford (7) found this in Wisconsin in the pea disease survey in 1924, but it was of minor importance.

Undetermined rootrots

Rootrots of undetermined cause were reported from Connecticut, New York, eastern Virginia, South Carolina, and Kansas. Chupp estimated a loss of 3 to 5 per cent in New York, but stated that, "The canning crop specialist of the state believes that much which this year was diagnosed as root rot was really Ascochyta blight, which he says was extremely severe in this state."

Recent literature:

1. Baunache, Pflanzenschutzmittel u. -geräte. Betanal. (Plant protection preparations and apparatus. Betanal.) Die Kranke Pflanze 2: 103-104. 1925.

2. Drechsler, Charles. Root-rot of peas in the middle Atlantic states in 1924. Phytopath. 15: 110-114. Feb. 1925.

3. Haenseler, C. M. What of the pea root rot? Experiment station facing the problem. New Jersey Agr. 7 (4): 4. April 1925.

4. Jones, F. R. A mycorrhizal fungus in the roots of legumes and some other plants. Jour. Agr. Res. 29: 459-470. Nov. 1, 1924.

5. ----------- Soil-inhabiting fungi parasitic upon the pea plant and their relation to disease. (Abstract) Phytopath. 15: 59. Jan. 1925.

6. ----------- and Charles Drechsler. Root rot of peas in the United States caused by Aphanomyces euteiches (n. sp.). Jour. Agr. Res. 30: 293-325. Feb. 15, 1925.

7. ----------- and M. B. Linford. Pea disease survey in Wisconsin. Wisconsin Agr. Exp. Sta. Res. Bul. 64: 1-30. July 1925.

8. Linford, M. B. A wilt disease of peas in Wisconsin. (Abstract) Phytopath. 16: 75. Jan. 1926.

9. ----------- and R. E. Vaughan. Rootrot of peas. Wisconsin Agr. Exp. Sta. Circ. 188: 1-10. 1925.

10. Manns, T. F., and J. F. Adams. (Report of) Department of plant pathology and soil bacteriology. Delaware Agr. Exp. Sta. Bul. 139: 24-29. 1925.

11. Richards, B. L. Plant pathology. <u>In</u> Utah Agr. Exp. Sta. Bul. 192 (Bienn. Rept. Director 1923/24): 58-61. 1925.

12. Russell, H. L., F. B. Morrison, and W. H. Ebling. Root rot in peas surveyed. <u>In</u> New pages in farm progress. Wisconsin Agr. Exp. Sta. Bul. 373 (Ann. Rept. Director 1923/24): 11-12. April 1925.

13. Stone, R. E. Root rot or blight of canning peas. (Abstract) Phytopath. 15: 300. May 1925.

BLIGHT CAUSED BY MYCOSPHAERELLA PINODES BERK. & BLOX.

Ascochyta blight was unusually severe in New York and New Jersey in 1925, as indicated in the quotations given below. It was said by Nelson to be the most prevalent pea disease in Michigan, although it caused very little damage. In other states reporting the disease, including Delaware, Maryland, Georgia, Florida, Ohio, and Wisconsin, it was unimportant.

<u>New York:</u> In looking over the pea fields of western New York last week, it developed that a type of disease simulating a wilt was due to an extraordinarily heavy infection with <u>Ascochyta pisi</u>. This fungus occurs heavily distributed over the aerial parts, causing

withering from the top with very abundant minute spotting. (Charles Drechsler, Bur. Plant Ind., July 16).

Blight of peas caused by Ascochyta pisi during the season of 1925 caused a 10 to 20 per cent decrease in the pea crop yield of the state as well as reducing the quality of the canned product, according to L. K. Jones, Geneva Experiment Station. (Chupp)

New Jersey: General, very important as an underground disease, causing a firm brown rot of tap root and underground portion of stem. Leaf and pod blight very rare this year, but root rot stage unusually severe. Infection evidently from seed. (Haenseler)

BACTERIAL BLIGHT CAUSED BY BACTERIUM PISI (SACK.) EFS.

Bacterial blight was apparently somewhat more prevalent than usual in the states from which it was reported - eastern Virginia, Kentucky, South Carolina, Wisconsin, and Minnesota. In South Carolina it was said to be severe in the Coastal Plain area, where it caused heavy loss. In Wisconsin it was of general occurrence but worse in the northern pea sections. It was of major importance in early varieties, but very little occurred on sugar peas, according to Vaughan.

Pods of Little Marvel variety affected with a spot determined by Miss Helen Fox of the Bureau of Plant Industry to be caused by this organism were received from Valleau of Kentucky. Ludwig (1) has reported a podspot in South Carolina, observed first in 1922, due to an organism which he believes to be a strain of Bacterium pisi.

Recent literature:

1. Ludwig, C. A. Pseudomonas (Phytomonas) pisi Sackett, the cause of a pod spot of garden peas. (Abstract) Phytopath. 16: 75. Jan. 1926.

2. Manns, T. F., and J. F. Adams. (Report of) Department of plant pathology and soil bacteriology. Delaware Agr. Exp. Sta. Bul. 139: 24-29. 1925.

DOWNY MILDEW CAUSED BY PERONOSPORA VICIAE (BERK.) D BY.

In 1925 downy mildew was reported from Maine, New York, Wisconsin, and Iowa, in no case as of importance. Folsom stated that the disease had not previously been recorded for Maine.

In Supplement 41, on pages 195 and 285, Peronospora trifoliorum D By. is erroneously reported as occurring on peas in Wisconsin, as follows:

"Peronospora trifoliorum D By., downy mildew - A second downy mildew on peas, reported for the first time to the Plant

Disease Survey, was found near Madison, Wisconsin, June 10 by F. R. Jones and M. B. Linford. Dr. Jones made the determination and reported that the fungus was the same as that occurring on sweet clover."

This report is an error due to misinterpretation of the following paragraph in a letter, dated July 21, 1924, from Dr. R. E. Vaughan:

"Dr. Jones has examined these* carefully, and advises that there is no difference in the fungus on sweet clover and peas."

*-- Specimens of sweet clover and peas affected with downy mildew.

MOSAIC (UNDETERMINED)

Mosaic of peas was reported from New Jersey and Michigan. Haenseler reported that in the former state there was more than last year or than usual, and stated that "It is apparently increasing in importance yearly. This year as high as 60 per cent of the plants were observed affected in one small planting. Alaskas apparently are less affected than others." In Michigan mosaic occurred on all varieties of field peas in test grounds at East Lansing, according to reports.

Jones and Linford (2) report that in the pea disease survey in Wisconsin in 1924 mosaic was found in 63 fields in 10 counties, the amount of infection varying from a trace to 20 per cent. Injury apparently was negligible except in a few fields with heavy infection, and the disease is regarded as not likely to be so destructive as the mosaics of some other crops. Doolittle and Jones (1) state that the same disease occurs much more severely on sweet peas. Observations indicated that the source of infection of both garden and sweet peas was mosaic red clover, and inoculation experiments proved the mosaics of red clover and of garden and sweet peas to be intertransmissible. It is believed that the pea aphis, which overwinters on red clover, carries the disease in the spring from mosaic red clover to peas. No evidence of seed transmission has been found. Cross-inoculations from mosaic bean and sweet clover plants to garden peas and sweet peas gave only negative results.

Recent literature:

1. Doolittle, S. P., and F. R. Jones. The mosaic disease in the garden pea and other legumes. Phytopath. 15: 763-771. Dec. 1925.

2. Jones, F. R., and M. B. Linford. Pea disease survey in Wisconsin. Wisconsin Agr. Exp. Sta. Res. Bul. 64: 1-30. July 1925.

OTHER DISEASES

Erysiphe polygoni DC., powdery mildew, was reported from New York, Florida, Washington, and Oregon. Weber reported that in Florida "It was

very destructive on English peas in the vicinity of Gainesville during the past season, producing abundant perithecia." In Oregon, according to Barss, it was severe locally. The County Agent of Clatsop County reported that "Farmers growing peas for market controlled it satisfactorily this year by throwing sulfur dust on the plants by hand, which stopped all injury."

Septoria pisi West., leaf blotch. Vaughan reported from Wisconsin, "Occurs mostly on vines in full vigor. Little injury to weak vines and vigorous vines seem to stand it."

Stemphyllium polymorphum Bon. (probably), leafspot. Specimen received from Maine, determined by Drechsler, who stated that the fungus seemed to be a true parasite on the leaves.

Botrytis sp. causing stem lesions, specimen received from Maine.

Fertilizer burn, Connecticut. "Had a few cases called to our attention by County Agent where roots were injured by putting fertilizer in with seed and not properly mixing with soil. Verified by experiments later." (Clinton)

Hail injury was severe locally in Wisconsin on early Alaska plantings that had pods set at the time of storms, June 9 to 14. (Vaughan)

Recent literature:

1. Jones, F. R., and M. B. Linford. Pea disease survey in Wisconsin. Wisconsin Agr. Exp. Sta. Res. Bul. 64: 1-30. July 1925.

2. Reid, W. D. Collar-rot of peas. Incidence of the disease. New Zealand Jour. Agr. 30: 250-255. April 1925.
Organism not given; disease is of decided economic importance.

DISEASES OF COTTON

WILT CAUSED BY FUSARIUM VASINFECTUM ATK.

Cotton wilt is a disease which is usually very destructive locally. When non-resistant varieties are planted on severely infested soil the losses are frequently very large and sometimes the entire crop is destroyed. In general, less damage from wilt than usual was reported throughout the cotton growing states in 1925. Probably the principal reason for the decreasing loss from cotton wilt is the increase in the use of wilt-resistant varieties, brought about through the efforts of extension workers and other federal and state agencies. The estimated losses for 1925 are shown in the following table.

Table 32. Estimated percentage loss from cotton wilt in 1925.

Percentage loss	States reporting	Percentage loss	States reporting
5	South Carolina, Mississippi	2	North Carolina, Georgia
4	Alabama	1	Virginia, Louisiana, Texas, Arizona
3	Arkansas		

North Carolina: This disease is very destructive in the area near the South Carolina line in the coastal plain. It is much less abundant in the northeastern portion of the state. Dixie-Triumph wilt-resistant cotton ordinarily gives good control. (Fant)

South Carolina: Common over state wherever wilt-resistant cotton was not grown. (Fenner)

Georgia (southern): Usually always present where susceptible varieties are used. Growers turning more to resistant varieties. (Boyd)

Mississippi: Unusually severe and serious damage in many localities. Drought and heat increased damage. (Beal)

Arkansas: Prevalent over much of state, causing serious loss in many sections. (V. H. Young)

Porto Rico: Severe on Sea Island cotton in one locality. (Cook)

Rosen (2) reports that Fusarium vasinfectum prevents cotton seed from germinating and causes damping-off of the seedlings. Young (3) found that apparently there are distinct strains of the fungus, varying in pathogenicity for cotton.

Recent literature:

1. Kottur, G. L. Improvement of cotton by breeding wilt resistant strains. Bul. Dept. Agr. Bombay, India, 119: 15-18. 1925.

2. Rosen, H. R. Fusarium vasinfectum and the damping off of cotton seedlings. Phytopath. 15: 486-488. Aug. 1925.

3. Young, V. H. Cotton wilt studies. (Abstract). Phytopath. 16: 76. Jan. 1926.

ANTHRACNOSE CAUSED BY GLOMERELLA GOSSYPII (SOUTHWORTH) EDG.

Anthracnose was present in practically all of the cotton states, but much less damage than usual was reported in 1925. This was attributed to the unusually dry summer which prevailed in the Southern States. The effect of this exceptionally dry weather upon the severity of anthracnose is well illustrated in the accompanying table, in which estimated losses from anthracnose and the departures from normal rainfall in the cotton states during August and September in 1920 and in 1925 are compared.

Some comments by collaborators regarding weather and anthracnose follow:

North Carolina: Excessively dry season held anthracnose in check. (Fant).

Georgia: North Georgia very dry, South Georgia dry late in season. Fairly dry in early season in all parts of state. (R.R.Childs)

Georgia (southern): Slow and sparing development in April and May due to dry weather. (Boyd)

Alabama: Extremely dry weather almost prohibited the growth of any anthracnose. (Blain & Miles)

Mississippi: Damage light over state as a whole. A few heavy infections in lowlands and rank growing cotton. One per cent. (Beal)

Arkansas: Appears to be of little importance this year. Dry weather apparently unfavorable. (V. H. Young)

Table 33. Estimated losses from cotton anthracnose, and departures from the normal rainfall during August and September, 1920 and 1925.

State	1920 Precipitation departure from normal: August	1920 Precipitation departure from normal: Sept.	1920 Percentage loss	1925 Precipitation departure from normal: August	1925 Precipitation departure from normal: Sept.	1925 Percentage loss
Virginia	+2.35	-0.16	5	-2.12	-1.58	0.5
North Carolina	+2.30	+0.95	15	-2.63	-1.96	1
South Carolina	+1.95	+1.48	8	-4.40	-2.14	Trace
Georgia	+2.31	+0.05	5	-3.73	-2.10	0.1
Alabama	+2.48	-0.71	2	-3.17	-0.85	Trace
Mississippi	+0.58	-0.19	3	-2.02	-0.24	--
Louisiana	+1.10	-0.02	5	-1.98	+1.69	1
Texas	+3.03	-0.65	1	-0.38	+1.53	0
Arkansas	+0.27	+0.06	2	-2.02	+2.63	Trace

Lehman (1) found that the anthracnose fungus present in infected cotton seed could be destroyed by exposing the seed to 20 to 24 hours desiccation at 60° to 65° C., followed by 12 hours of heating at 95° to 100° C., without reducing the percentage of germination. The anthracnose fungus was found to be killed in the seed by the dry heat, while the preliminary desiccation was necessary to prevent destruction of the germinability of the seed. He describes and illustrates a machine for treating cotton seed in bulk with dry heat.

Recent literature:

1. Lehman, S. G. Studies on treatment of cotton seed. North Carolina Agr. Exp. Sta. Tech. Bul. 26: 1-71. July 1925.

2. Ludwig, C. A. Studies with anthracnose infection in cotton seed. South Carolina Agr. Exp. Sta. Bul. 222: 1-52. 1925.

ANGULAR LEAFSPOT CAUSED BY BACTERIUM MALVACEARUM EFS.

Only two states, Louisiana and New Mexico, reported angular leafspot

to be more prevalent than during the average year and more prevalent than in 1924. In Arkansas it was reported to be more prevalent than in 1924, but the same as average years. In none of the other nine states from which it was reported was it said to be more prevalent than in 1924, or than average years. It was not observed in California in 1925.

Table 34. Estimated percentage losses from angular leafspot in 1925.

Percentage loss	States reporting	Percentage loss	States reporting
3	Arkansas, Arizona	1	Georgia, Texas
2	New Mexico	Trace	Virginia
1.5	Alabama		

North Carolina: Little damage, apparently because of dry season. (Lehman)

South Carolina: Severe leaf spotting and stalks infected heavily. Reported only in Piedmont region. (Fenner)

Georgia (southern): Mostly leaf-spotting; very little boll rot. Light infection over entire Coastal Plain, especially in low, damp areas. (Boyd)

Alabama: Extreme drought of past summer responsible for decrease in prevalence. (Miles & Blain)

Arkansas: Common but apparently causing less damage than usual. Boll-rotting by secondary invasion not favored by dry weather. (V. H. Young)

New Mexico: Considerable seed delinted with sulphuric acid. This gives good control. (Crawford)

Brown and Gibson (2) describe a machine which they devised for treating cotton seed with sulphuric acid, particularly for the control of this disease.

Recent literature:

1. Ashby, S. F. Control of angular leafspot of cotton. Trop. Agriculture 3: 8-9. Jan. 1926.

2. Brown, J. G., and Frederick Gibson. A machine for treating cotton seed with sulphuric acid. Arizona Agr. Exp. Sta. Bul. 105: 381-391. 1925.

3. Rolfs, F. M. Two important cotton diseases and their control. Oklahoma Agr. and Mech. Coll. Ext. Div. Circ. 208: 1-8. 1925.

ROOTKNOT CAUSED BY HETERODERA RADICICOLA (GREEF) MUELL.
(CACONEMA RADICICOLA (GREEF) COBB)

In 1925 rootknot was reported from practically all of the cotton states, but it was considered important only in local areas, where it was associated frequently with Fusarium wilt. It is well known that when wilt-resistant cotton is planted on soil severely infested with both Fusarium vasinfectum and Heterodera radicicola, it may become more or less severely infested with wilt. A case of this kind was reported from Georgia by Boyd, who stated that wilt was common in resistant varieties on root-knot land. The estimated losses from rootknot in 1925 were as follows: New Mexico, 3 per cent; Arkansas, 2 per cent; southern Georgia, 2 per cent; Alabama, Texas, and Arizona, a trace.

BLIGHT CAUSED BY ASCOCHYTA GOSSYPII SYD.

Ascochyta blight, which prior to 1924, had been reported only from Arkansas, was again reported from North Carolina and South Carolina, but not from Virginia, in 1925, and was reported to the Survey for the first time from Alabama and Mississippi. The following are statements from collaborators regarding this disease:

North Carolina: It may be of interest to plant pathologists to have a statement regarding the occurrence of Ascochyta blight of cotton in North Carolina in 1925. The first observed occurrence of this disease was on June 19 when a package of young plants badly affected with a disorder which was diagnosed as tomosis by Dr. O. F. Cook was sent from Lee County to the Plant Disease Laboratory of the North Carolina Agricultural Experiment Station. On the cotyledonary leaves of the plants there occurred lesions resembling those produced by Ascochyta gossypii on ordinary foliage leaves and bearing pycnidia and pycnospores which agree in morphological features with those of that fungus. In the same week the disease was found on seed leaves of young plants received from two other counties, making a total of three, all lying west of Raleigh. In these three counties the disease did not appear on cotton at any time later in the season.

During the first week of July the disease appeared again, this time in mild epidemic form in parts of three counties lying east of Raleigh. Not over 10 per cent of the plants in any field were affected. In these counties the disease developed after rainy weather of several days duration. An early decrease in the frequency and amount of rainfall caused the disease to disappear and most of the infected plants apparently completely recovered.

The early summer of 1924 was marked by prolonged and frequent rainfall and in that year Ascochyta blight occurred in epidemic form over the greater portion of the cotton growing area of the state. The summer season of 1925 was characterized by drought, and in this year Ascochyta blight failed to occur in

serious form, except in the few isolated areas noted above which did experience temporary excesses of rainfall. (Lehman)

South Carolina: Present in Spartanburg County. The specimen showed considerable angular leafspot also, so that it is likely that the weather had been moist where the outbreak occurred. The weather, in general, however, has been unusually dry. (Ludwig, July 31)

Alabama: We have found an infection of Ascochyta blight, *Ascochyta gossypii*, on cotton at Luverne, Alabama.

The first infection in Alabama was found last year at Ashford, in the extreme southeastern part of the state. This year's infection is about 100 miles north of last year's infection. This is rather remarkable to me in that the weather around Luverne has been dry this year. Elliott reported the infection in Arkansas as bad in rainy weather, with an abrupt stopping of the infection and recovery of some plants with the advent of dry weather. The man who sent the sample in to the office said it was local, occurring in only one spot in the field. (Blain, July 3)

Mississippi: This disease was reported in August from Lowndes County near Columbus, Mississippi, and was observed by the writer. A small area in this particular field was infected. The damage, however, to infected plants was 100 per cent, as in many cases the plants were killed from the tops about two-thirds of the way down the stalk. This is the first report of Ascochyta blight of cotton in Mississippi. (Neal, Sept.)

LEAFSPOT CAUSED BY ALTERNARIA SP.

A very severe outbreak of Alternaria leafspot was reported from Arizona in 1925. The disease was also reported from Virginia, Mississippi, Arkansas, and California. Collaborators from Mississippi and Arkansas reported it to be associated with potash deficiency and dry weather injury. In Virginia it was said to be associated with angular leafspot and red spider injury.

In a letter dated November 24, 1925, Collaborator D. G. George of Arizona wrote the following:

"This disease occurs every year in Arizona, and especially in the Salt River Valley. The present outbreak is the most severe that I have ever observed, although the season of 1919 was a close second. During the past month I have visited practically all of the communities of the Salt River Valley and everywhere the disease is found. No one section or district is any more seriously attacked than another. Much of the early shedding of the leaves of the Pima cotton I attribute to this disease.

"It appears that the present outbreak is somewhat related to the weather. On September 17 and 18 nearly one-half inch of rain fell. Cloudy weather with high humidity prevailed for some

time following, and on October 5 and again on October 15 we had some slight showers. This rainfall was earlier than usual and before any frosts had occurred. The fruiting stage of the organism seemed to develop rapidly during this period.

"The disease occurs on all the varieties of cotton that I have examined, but is very light upon the short staple cotton. In this section this is principally the Acala, the Mebane, and a variety known as the Hartsville cotton. The Acala predominates in practically all the region. Probably 50 per cent of the cotton in the Salt River Valley is the Pima variety of the long staple cotton. Upon this cotton the disease was very abundant and, as I have already stated, caused an early shedding of the leaves. Since the outbreak came after the largest majority of the bolls were nearly mature and some picking was in progress I can hardly make an estimate of the actual loss occasioned by the disease."

BOLL ROTS AND BOLL SHEDDING DUE TO VARIOUS CAUSES

Boll rots due to <u>Diplodia gossypina</u> Cke. (<u>Physalospora gossypina</u> (Cke.) Stevens (4)), <u>Phytophthora</u> sp., and <u>Fusarium</u> sp. were reported from Porto Rico. Diplodia boll rot was reported from Georgia also, and undetermined boll rots from South Carolina and Arkansas. Shapovalov makes the following statement regarding boll shedding and boll decay in California.

"Shedding of young bolls has been very pronounced this season. Judging from the number of complaints and inquiries it has probably been greater than usual. Very often the shed bolls are showing a brown discoloration of the pedicel near the bracts, and several fungi have been isolated from such discolored areas.

"Several forms of boll decay have been observed, principally on the earlier sets. In many cases the infection was clearly originating with an insect injury, particularly that of the boll worm, but in some instances no such injury was apparent, or at least it was too small to be detected after the decay had set in. Species of Rhizopus, Fusarium, and Aspergillus have been found associated with the decaying bolls."

<u>Aspergillus niger</u> Tiegh. is reported by Shapovalov (3) to be causing decay of cotton bolls in the southwestern states. He says,

"A peculiar decay of cotton bolls has been prevalent during the last few years in the southwestern states. It appears at first as a soft, pinkish, circular spot and may spread over the entire boll. The latter prematurely dries up and becomes filled, and covered on the outside with black masses of spores which give it the appearance of being affected by smut. It is erroneously known as smut in some cotton-growing sections of California. The fungus causing this decay is <u>Aspergillus niger</u>. The infection is sometimes associated with insect wounds, but frequently such injuries are not apparent...."

irkpatrick (2) reports that Rhizopus nigricans Ehr. is an important cause of boll decay in Egypt, infecting the bolls through insect punctures. At least two species of Phytophthora, one of them apparently having two strains, are responsible for the soft rot of cotton bolls in the West Indies, according to Hopkins (1).

Recent literature:

1. Hopkins, J. C. Notes on the soft rot of cotton bolls in the West Indies caused by Phytophthora. Ann. Bot. 39: 267-280. April 1925.

2. Kirkpatrick, T. W. Notes on the fungus Rhizopus nigricans Ehr. in relation to insect pests of the cotton plant in Egypt. Bul. Tech. & Sci. Serv. Min. Agr. Egypt 54: 28 pp. 1925.

3. Shapovalov, Michael. Aspergillus decay of cotton bolls. (Abstract) Phytopath. 16: 75. Jan. 1926.

4. Stevens, Neil E. The life history and relationships of Diplodia gossypina. Mycologia 17: 191-201. 1925.

SORESHIN CAUSED BY CORTICIUM VAGUM BERK. & CURT.

Losses reported as due to Rhizoctonia are New Mexico 5 per cent, Texas one-half per cent, Arizona a trace. The disease was also reported from Louisiana, California, and Porto Rico.

Arizona: Two-thirds reduction of stand in a 20-acre field of cotton in Cochise County. The injury was aggravated by irrigating the field when the young plants showed the first injury. (Streets)

California: Due to exceptionally cool weather during the early stages of growth there was more than the usual amount of sore-shin. As a rule, however, the worst attack of the disease appeared before the cotton was thinned out and the stands therefore were not affected appreciably. Only in a few instances in the San Joaquin Valley dead patches several yards in diameter could be observed in certain fields as a result of the sore-shin infection. (Shapovalov)

Briton-Jones (1) gives the cause of sore-shin in Egypt as Rhizoctonia crocorum (Pers.) DC.

Recent literature:

1. Briton-Jones, Harry R. Mycological work in Egypt during the period 1920-1922. Bul. Tech. & Sci. Serv. Min. Agr. Egypt 49: 1-129. 1925.

ROOTROT CAUSED BY OZONIUM OMNIVORUM SHEAR (HYDNUM OMNIVORUM SHEAR)

Ozonium rootrot caused losses estimated at 8 per cent in Arizona, 5 per cent in New Mexico, and one per cent in Texas, and was reported from California also.

Arizona: In southern half of state. (Streets)

California: The Ozonium rootrot is quite prevalent in the eastern cotton sections of California, along the Colorado River, namely in the Bard Section and in the Palo Verde Valley, but has not yet been found either in the Imperial or in the San Joaquin Valleys. (Shapovalov)

Shear (2) has described a fungus considered to be the perfect form of the rootrot organism as *Hydnum omnivorum* Shear.

Recent literature:

1. Rolfs, F. M. Two important cotton diseases and their control. Oklahoma Agr. & Mech. Coll. Ext. Div. Circ. 208: 1-8. 1925.

2. Shear, C. L. The life history of the Texas root rot fungus, Ozonium omnivorum Shear. Jour. Agr. Res. 30: 475-477. 1925.

POTASH DEFICIENCY (NON-PARASITIC)

"Rust" was reported unusually severe in Mississippi in 1925, the dry hot summer having made it prevalent in thin, sandy soils. Rolfs stated that it was common in various sections of Oklahoma, the injury resulting being slight in most cases, but as much as 20 per cent in some. The disease was said to be rather prevalent in Arkansas and unimportant in South Carolina.

OTHER DISEASES

Cerotelium gossypii (Lagh.) Arth. (*Kuehneola gossypii* (Lagh.) Arth.), rust. Porto Rico.

Helminthosporium gossypii Tucker, leaf, bract, and boll spot. Porto Rico.

Macrosporium nigricantium Atk., leafspot, black rust. South Carolina.

Mycosphaerella gossypina (Cke.) Earle (*Cercospora gossypina* Cke.), leafspot. Louisiana, Texas, Porto Rico.

Puccinia hibisciata (Schw.) Kell. (*Aecidium gossypii* Ell. & Ev.), rust. Texas.

Ramularia areola Atk., frosty mildew. Georgia, Porto Rico.

Sclerotium rolfsii Sacc., seedling disease. Porto Rico (one plant on Station grounds).

Recent literature:

1. Kalantarian, P. Zwei neue Bakteriosen der Baumwollstaude in Armenien. Centralbl. Bakt. Abt. II, 65: 297-301. Oct. 3, 1925.

Bacterium erivense causing disease of seedling roots, B. löhnisi on flower and capsule.

DISEASES OF TOBACCO

WILDFIRE CAUSED BY BACTERIUM TABACUM WOLF & FOSTER

Wildfire was first reported from North Carolina in 1917. It is now known to occur in practically all tobacco growing regions in the country, having been reported from additional states and parts of states almost every year since that time. In 1925 wildfire was reported from Massachusetts, Connecticut, New York, Maryland, Virginia, South Carolina, Georgia, Florida, and Wisconsin, and from Canada for the first time by Slagg and Major. The following are some of the reports of collaborators regarding the occurrence and severity of wildfire in 1925.

Massachusetts: Very serious in the field especially following seedbed infection in the Connecticut Valley. (Osmun & Davis)

Connecticut: Little in seed beds. Common in mid-season, but finally did less injury than expected. (Anderson)

Maryland: During the summer, following a series of showers, wildfire appeared in a large number of fields. Many of these fields were surveyed and in some cases injury was slight while in others the lower leaves were severely infected and the disease was found on practically all of the leaves. In one instance the crop was harvested prematurely to prevent total loss. The most severe injury was found in fields which had been set from beds in which wildfire had occurred, but which had not been sprayed or dusted. Later inspections indicated that further dissemination of the disease was prevented by the dry weather during the remainder of the season. (Jehle)

Florida: Appeared locally, damage slight. Four plant beds of about one-fourth acre each destroyed. Two were covered with second hand cloth from Connecticut. The other two were fertilized with tobacco trash from packing houses. No plants from any bed were transplanted. (Tisdale)

Georgia: Lack of development probably due to general lack of sufficient and frequent rainfall. (Boyd)

Wisconsin: Wildfire did little damage this year due to dry weather in May which did not favor seed bed infection, and dry weather in August. The absence of storms was also unfavorable for disease spread. Disease present on about 50 farms. (Johnson)

Quebec: Found on 6 farms near St. Cesaire. Owing to the dry weather during the month of August the damage was light. This is the first positive record of the occurrence of this disease in Canada. (Slagg & Major, Sept. 25)

Control of wildfire

For the control of wildfire general sanitation combined with seed treatment are most generally recommended. The bichloride of mercury treatment which consists in soaking the seed 10 to 15 minutes in a 1 to 1000 solution followed by thorough washing and drying of the seed is in most general use. Johnson and Murwin (4) found that infected tobacco seed could be successfully disinfected with a 1 to 1000 solution of silver nitrate. They believe two 5 or 10 minute treatments (drying the seed between treatments) is required for wildfire control. Seed bed spraying and dusting with a copper fungicide were found by Anderson (1) to check the spread of wildfire in the seed bed, provided the fungicide was supplied frequently enough to keep the leaves covered at all times.

Requests were sent to a number of tobacco specialists for results of seed treatment and seed bed dusting and spraying and the following information was received.

Connecticut: Seed treatment has been tried but the results are not easy to interpret. When wildfire gets into the seedbed one never knows whether it came in on the seed or by some other channel. I have frequently found wildfire in beds where the seed was sterilized. It is doubtful whether infected seed has much to do with our trouble here.

Seedbed spraying is efficient and our very best method of controlling wildfire, and I depend on it almost entirely. We have used both copper-lime dust and various Bordeaux sprays, but the liquid is preferred. Spraying is better in the hands of the average grower. Field spraying has given promising results but is not usually recommended because it is too much work. (Anderson)

Maryland: No seed treatment tests were conducted. Approximately 500 seed beds were sprayed with Bordeaux mixture or dusted with copper-lime dust at weekly or ten-day intervals. In many beds the treatment was begun as soon as the tobacco leaves reached the size of a dime and continued until the plants were set in the field. No wildfire was found in any of these beds at any time. In several instances the tobacco growers left one or two untreated beds and in two such instances wildfire was found in the undusted beds. In many instances the beds were treated after wildfire had been found in them, varying in amount from a mere trace to severe infestation. In all such cases the disease was checked by the treatment and thrifty plants were obtained. When wild-

fire appeared in the beds early in the season and they were not treated, severe injury resulted, many of the plants being weak and stunted. When wildfire appeared late in the season its further spread was checked by dry weather, infected plants recovered, more or less, and there was little injury in untreated beds. (Jehle)

Virginia: Bichloride of mercury seed treatment gave good results when sanitary measures were observed. No spraying or dusting used excepting for flea beetle control.

Field occurrence is related directly to plant bed condition. If plant bed is free from disease, field will also be free. (Fromme)

Kentucky: Bichloride of mercury and formaldehyde seed treatment probably reduce infection in bed, but will not give control where other sanitary precautions are not carefully followed out. Plant bed infection is nearly sure to be followed by field infection if weather conditions are right. Seedbed spraying and dusting have not been tried. (Valleau)

Tennessee: Bichloride of mercury seed treatment gave good germination and clean plants, but no disease appeared on plants grown from untreated seed. Plants dusted only for insect control. (Sherbakoff)

Florida: Bichloride of mercury seed treatment - No infection in beds where new cloth was used for cover and beds were made on sterilized soil.

No infection has occurred in fields set with healthy plants, even though the crop was infected previously.

Seedbed spraying with Bordeaux 2-2-50 also 4-4-50, four to six applications. No bed showed infection, probably due to sanitary precautions observed. Seedbed dusting with Saunders copper-lime dust, 3-8 applications.

Where disease had appeared before treatment was begun further spread was checked, but severe infection developed in field on plants from treated beds. (Tisdale)

Wisconsin: The silver nitrate seed treatment discussed above gave more complete control of tobacco wildfire than treatment with corrosive sublimate and was less injurious to seed germination. Complete control in the seedbed usually results in complete control in the field. Spraying the seedbed with Bordeaux mixture gave only partial control. Dusting the seed bed with copper-lime dust gave only partial control. Spraying and dusting are not being recommended in Wisconsin. (Johnson)

Anderson (2) has reported the results of his investigations on the susceptibility of species, varieties, and hybrids of Nicotiana to wildfire. Forty-one horticultural and botanical varieties of *N. tabacum* were tested, of which not one showed any significant resistance. All the varieties of *N. rustica* and *N. alata* tried were highly resistant, as were also *N. repanda*, *N. nudicaulis*, and *N. attenuata*. The other species tested were susceptible in

varying degrees, from somewhat resistant to much more susceptible than N. tabacum. Hybrids resulting from crossing the resistant species N. nudicaul and N. alata with the susceptible N. tabacum were resistant but failed to set seed.

Recent literature:

1. Anderson, P. J. Controlling tobacco wildfire in the seed bed. Phytopath. 13: 59. 1923.

2. ----------- Susceptibility of Nicotiana species, varieties, and hybrids to tobacco wildfire. Phytopath. 15: 77-84. Feb. 1925.

3. Cooper, Thomas. Bacterial leaf-spot of tobacco. Ann. Rept. Director, Kentucky Agr. Exp. Sta. 37 (1924): 30-31. 1925.

4. Johnson, James, and Herbert F. Murwin. Experiments on the control of wildfire of tobacco. Wisconsin Agr. Exp. Sta. Res. Bul. 62: 1-34. 1925.

BLACKFIRE CAUSED BY BACTERIUM ANGULATUM FROMME & MURRAY

States from which blackfire was reported in 1925 were Connecticut, New York, Virginia, Kentucky, North Carolina, Georgia, Florida, Indiana, and Wisconsin. This is the first report of blackfire from New York. It was also reported by Slagg and Major to be present to a limited extent in the Quebec and Ontario districts of Canada. Following are some of the statements of collaborators regarding the occurrence of blackfire:

Connecticut: More frequent than I have seen it before in the Connecticut Valley. (Anderson)

New York: I found blackfire or angular leafspot of tobacco on six farms in the Big Flats district of Chemung and Steuben Counties In some cases the infection was mixed with wildfire and in others was distinct. Counts and estimates indicated a range in severity between a trace and 100 per cent affected plants. Blackfire seems to be fully as severe in that district this season as wildfire in the fields in which it occurs. So far as I know, this is the first time that blackfire has been found in New York state. (Thomas)

Virginia: Blackfire is becoming fairly prevalent, especially in sections that have had fair rains, and some crops have been harvested early to prevent further spread of disease. As a rule infection is limited to occasional plants in low areas. (Fromme)

Kentucky: Seed treatment with other sanitary precautions has failed to give complete control of angular leafspot and wildfire again if seed from the previous crop was used. In rather extensive tests two-year old seed has produced leafspot free plants both

on the Experiment Station Farm and on other farms where proper sanitary precautions were included. This appears to be a simple and very efficient method of eliminating this source of infection and will eliminate the seed treatment recommendation. Seed from plants from which all leaves were stripped at setting time have in one instance produced seed which resulted in a leafspot free bed. The seed plants were from an infected bed and were set in an isolated spot in the garden away from other tobacco. Several beds planted with two-year old seed were observed which were entirely free from leafspot diseases, except at one corner where the men made their inspections of the beds. These cases suggested very strongly infection from infected chewing tobacco spit into the corner while making the inspection. One instance was noted where infection with angular leafspot and wildfire in a bed sowed with two-year old seed could be traced to the use of canvas hung in a tobacco barn with an infected tobacco crop. (Valleau)

North Carolina: This disease is prevalent in North Carolina each season. It has been noted by the writer for the past three years. (Fant)

Florida: One bed, one-fourth acre, in Gadsden County showed infection early in the season. Dry weather prevented further spread in bed. Damage slight. (Tisdale)

Wisconsin: Less blackfire than last year, more commonly present than wildfire, but little damage done this year. (Johnson)

Recent literature:

1. Cooper, Thomas. Bacterial leaf-spot of tobacco. Ann. Rept. Director, Kentucky Agr. Exp. Sta. 37 (1924): 30-31. 1925.

2. Russell, H. L., F. B. Morrison, and W. H. Ebling. Black fire in Wisconsin tobacco. In New pages in farm progress. Wisconsin Agr. Exp. Sta. Bul. 373 (Ann. Rept. Director 1923/24): 9-11. 1925.

BLACK ROOTROT CAUSED BY THIELAVIA BASICOLA (BERK. & BR.) ZOPF

Massachusetts, Connecticut, New York, Florida, and Wisconsin reported this disease in 1925. It was also reported from Canada.

Massachusetts: Certain of Johnson's Wisconsin strains show high resistance. (Osmun & Davis)

Connecticut: General in Connecticut and Housatonic Valleys. (Anderson)

Florida: Appeared locally. In general, the weather was too warm and dry to favor development of rootrot. Also a small per cent of the crop was planted on old land. Damage was slight. (Tisdale)

Wisconsin: Rootrot occurred to a considerable extent this year on the older tobacco soils, being favored by a relatively cool season in June and early July. Occasional fields were complete losses, but more frequently the disease damaged the crops from 5 to 50 per cent. I would estimate that only about 10 per cent of the fields were affected, however. (Johnson)

Canada: Quite common in the seedbeds in Quebec and to a limited extent in Ontario. Owing to the comparatively dry season there was considerably less injury in the field than in 1924 in Quebec and Ontario. Present to a limited extent in British Columbia. (Slagg & Major)

Recent literature:

1. Clinton, G. P. (Report of the Connecticut State Station, department of) Botany. Connecticut State Agr. Exp. Sta. Bul. 264: 207-210. 1925.

2. Cooper, Thomas. Tobacco black root-rot. Ann. Rept. Director Kentucky Agr. Exp. Sta. 37 (1924): 28-29. 1925.

3. McCormick, F. A. Perithecia of Thielavia basicola Zopf in culture and the stimulation of their production by extracts from other fungi. Connecticut Agr. Exp. Sta. Bul. 269: 539-554. Aug. 1925.

4. Orton, C. R., and O. Olson. Tobacco resistant to black root-rot in Pennsylvania. Pennsylvania Agr. Exp. Sta.Bul. 193: 3-13. March 1925.

MOSAIC (UNDETERMINED)

Mosaic was reported from Connecticut, New York (estimated loss a trace to 2 per cent), Maryland (estimated loss 2 per cent), Virginia, Kentucky, North Carolina, South Carolina, Georgia, Florida, Indiana, Illinois, and Porto Rico. It was also reported from Canada by Slagg and Major as fairly common in Quebec and Ontario, and present to a limited extent in British Columbia.

Maryland: Very common and prevalent, some in almost every field. Percentage of infected plants usually large, often 95 per cent. (Jehle & Temple)

Virginia: Very prevalent in Amherst County, some fields showing 50 to 60 per cent affected plants. (Fromme)

Kentucky: Tests to control tobacco mosaic through the thorough eradication of mosaic carrying weeds from the tobacco bed have had no apparent effect. At setting time we have been unable, so far in our beds, to find any mosaic in the tobacco. Initial infection ranges from slight in parts

of fields to 8 and 10 per cent in other parts and the plants are so distributed as to indicate that certain men pulling plants cause high percentage of initial mosaic infection, and others very slight or none. Most tobacco men in Kentucky chew the natural leaf from the previous crop. By wetting the hands in chewing tobacco decoction and pulling plants, we have obtained 83 per cent infection in about 170 plants, while the checks pulled with clean hands from the same area in the bed, remained free. Other evidence indicates that when clean plants are set in the close vicinity of mosaic infected weeds very early in the season and are fed upon extensively by flea beetles, they will still remain free if not handled by man. It appears now that infected chewing tobacco will largely explain initial mosaic infection, although the mosaic weed carriers may, and undoubtedly do, under some circumstances, play a part in dissemination of mosaic. (Valleau)

North Carolina: Prevalent in eastern portion of the state. (Fant) Unusually widespread in tobacco sections. As a rule farmers do not pay much attention to it but this year they were much concerned. No estimate of loss is available but serious damage resulted. (W. W. Garner)

Georgia (southern): Considerable importance in the older tobacco sections (flue cure). Topmost leaves only injured; lowering quality of affected leaves. Seventy-five per cent in a 3-acre field, Valdosta, only the upper 3 or 4 leaves showing symptoms. (Boyd)

Florida: Mosaic appeared locally, many fields in Gadsden County slightly affected. The damage was very slight. The disease was found on few plants in several fields early in the season. It became general on suckers after plants were topped. (Tisdale)

Requests for information upon the effect of mosaic upon yields and quality were sent to a number of tobacco specialists and the following statements were received:

Connecticut: Effect on yield - Reduces yield considerably if plant is attacked early.

Effect on quality - Absolutely ruins our cigar types of tobacco. (Anderson)

Maryland: Effect on yield - When mosaic attacks the plant early in its development the yield is affected. Ten healthy plants and ten plants severely infected with mosaic were cut from the same field and stored in the same tobacco barn. When cured the infected plants weighed 5 pounds and the uninfected plants weighed 6 1/5 pounds.

Effect on quality - The same plants were graded by an expert tobacco grader who was not aware of the presence of mosaic in them. The infected plants were valued at 10 cents per pound less than the uninfected plants. (Jehle)

Virginia: Effect on yield - Uncertain. It is quite prevalent especially near the end of the season. Farmers do not worry much about it.

Effect on quality - Some reduction in quality and price, but not of sufficient moment to bring the loss home to the farmers. They have leaf troubles of greater importance, such as blackfire and drought-spot, and the presence of mosaic does not worry them. (Fromme)

Kentucky: Effect on yield - No figures on this, but in some cases it undoubtedly reduces it markedly if there is extensive initial infection.

Effect on quality - No figures, but mosaic burning in Burley tobacco is often extensive and must reduce quality very appreciably. (Valleau)

Tennessee: Effect on yield - The yield is reduced appreciably.

Effect on quality - Apparently the quality is lowered; however, I am not able to state definitely to what extent. (Sherbakoff)

Georgia: Effect on yield - Not determined, except as in a general survey, very little reduction.

Effect on quality - Not determined. (Boyd)

Florida: Effect on yield - Does not occur in sufficient amounts to affect yield. Usually does not develop except on suckers.

Effect on quality - Caused light chaffy or papery leaves, which are discarded. (Tisdale)

Wisconsin: Effect on yield - Early mosaic infection usually markedly lowers yield, but this is of course proportional to percentage of plants affected. Late infection (which is common) may not appreciably affect yield.

Effect on quality - The effect of quality applies particularly to cigar wrappers and binders, the leaf being usually less elastic, more "papery", lacking in good color and in some cases spotted due to necrotic effect of virus under certain conditions. (Johnson)

Results of experiments conducted by Elmer (2) seem to indicate that healthy plant juices produce an inhibitory effect on tobacco mosaic virus, but that this effect is not permanent. The same writer (3) has also studied the transmissibility of the mosaic virus. Successful infection was obtained on tobacco from bean (Phaseolus vulgaris), cucumber (Cucumis sativus), crookneck squash (Cucurbita pepo condensa), Zinnia elegans, Calendula officinalis, Stokesia laevis, sugar cane (Saccharum officinarum), corn (Zea mays), celery (Apium graveolens), Rubus strigosus, Asclepias syriaca, Martynia louisiana, Abutilon theophrasti, Euphorbia preslii, Aquilegia canadensis, Aquilegia coerulea, Datura stramonium, and Nicotiana glutinosa. Mosaic was transmitted from tobacco to Cucurbita pepo, Martynia louisiana, and Nicotiana glutinosa. Walker (16) found that the mosaic of Nicotiana glutinosa was readily transferred to tobacco.

Johnson (7, 14) produced "mottle", "spot necrosis", and "ringspot" by

inoculating tobacco plants with extract from apparently healthy potato plants, and in a paper read before the American Phytopathological Society (6), he stated that at least six other virus diseases may affect tobacco and related plants.

In another paper Jones (8) described a mycetozoan found by him in tobacco plants with mosaic-like symptoms. Mulvania (10) attempted to grow the tobacco mosaic virus in culture by using Olitsky's method (11), but was unsuccessful. McKinney and Webb (9) state that in the course of dilution experiments, using mosaic virus from a single plant "By inoculating the plants of a given experiment with diluted virus from a mosaic plant resulting from inoculations with highly diluted virus in the preceding experiment, mosaic was obtained in the eighth experiment in practically undiminished amounts from virus which had passed through eight plants and which had been diluted in water equivalent to 10^{-33}. A single water dilution of this magnitude being far too great to produce mosaic, it is evident that the quantity of virus increased in the plants." They report also that their studies show that tobacco mosaic infection may occur from the soil.

Recent literature:

1. Dickson, B. T. Tobacco and tomato mosaic. Science n. s. 62: 398. Oct. 30, 1925.

2. Elmer, O. H. Inhibition of mosaic infection. (Abstract) Phytopath. 16: 67-68. Jan. 1926.

3. ----------- Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 39-91. 1925

4. Hansen, A. A. Controlling diseases by destroying weeds. Better Crops 4 (4): 22-23, 28-29. June 1925.

5. Hauduroy, P. La nature du virus de la mosaique de tabac. Rev. Path. Comp. 25: 748-750. July 20, 1925.

6. Johnson, James. New virus disease of tobacco and related plants. (Abstract) Phytopath. 16: 66. Jan. 1926.

7. ----------- Transmission of viruses from apparently healthy potatoes Wisconsin Agr. Exp. Sta. Res. Bul. 63: 1-12. 1925.

8. Jones, Philip M. A mycetozoan found in tobacco plants with mosaic-like symptoms. (Abstract) Phytopath 16: 67. Jan. 1926.

9. McKinney, H. H., and R. W. Webb. The dilution method as a means for making certain quantitative studies of viruses. (Abstract) Phytopath. 16: 66. Jan. 1926.

10. Mulvania, M. Cultivation of the virus of tobacco mosaic by the method of Olitsky. Science n. s. 62: 37. July 10, 1925.

11. Olitsky, Peter K. Experiments on the cultivation of the active agent of mosaic disease in tobacco and tomato plants. Jour. Exper. Medicine 41: 129-136. Jan. 1925.

12. Olitsky, Peter K. The transfer of tobacco and tomato mosaic disease by the Pseudococcus citri. Science n. s. 62: 442. Nov. 13, 1925.

13. ---------- and John H. Northrop. The inoculation of tomato and tobacco plants with potato mosaic virus. Science n. s. 61: 544-545. 1925.

14. Rawlins, T. E., and James Johnson. Cytological studies of the mosaic disease of tobacco. Amer. Jour. Bot. 12: 19-32. 1925.

15. Russell, H. L., F. B. Morrison, and W. H. Ebling. Apparently healthy plants produce mosaic disease. In New pages in farm progress. Wisconsin Agr. Exp. Sta. Bul. 373 (Ann. Rept. Director 1923/24): 3-8. April 1925.

16. Walker, M. N. Studies on the mosaic disease of Nicotiana glutinosa. Phytopath. 15: 543-547. 1925.

ROOTKNOT CAUSED BY HETERODERA RADICICOLA (GREEF) MUELL. (CACONEMA RADICICOLA (GREEF) COBB)

Rootknot was reported to be of considerable importance locally in eastern North Carolina, in the Coastal Plain and Sand Hill regions of South Carolina, and throughout the Coastal Plain of southern Georgia, causing serious reduction in both yield and quality. In North and South Carolina a spotting of the leaves was attributed to the low vitality caused by the disease.

North Carolina: Rootknot of tobacco was rather prevalent in eastern North Carolina during 1925, especially in one locality where the plants were affected to the extent of approximately 80 per cent. The owner of one of these fields had threatened one of the fertilizer concerns with a law suit on account of a spotting of the leaves which he attributed to the fertilizer he had used. I am inclined to believe that rootknot of tobacco may bring about a spotting of the leaf through a loss of vitality on the part of the plant. We have no experimental data concerning this, however. (Fant, Jan. 18, 1926)

Georgia (southern): Very important in entire flue-tobacco district; throughout the Coastal Plain where tobacco is grown. Loss 35 per cent. Favorable temperature and sufficient moisture for vigorous infection in April and May, and during dry weather of May and June infected plants suffered seriously due to obstruction of water and nutrients, resulting in low quality. (Boyd)

LEAFSPOTS OF NON-PARASITIC OR UNDETERMINED CAUSE

Ringspot (undet.) was reported from Maryland and Wisconsin, as follows:

Maryland: More found in Maryland in 1925 than in any other year. In one field 75 per cent of the plants were affected. Some was present in practically every field inspected. (Jehle)

Wisconsin: A disease probably of physiological origin occurred frequently in portions of fields and caused considerable concern. Disease practically new to Wisconsin. Plants usually recovered so that only 3 to 5 leaves per plant were damaged, by becoming ragged. Cause could not be determined. (Johnson)

Drought spot. "This is becoming very general in Virginia in sections where there has been a marked deficiency in rainfall, especially in Appomattox and Halifax Counties. It is characterized by the burning of leaf margins and the development of large single or fused spots in the intercostal regions." (Fromme, Sept. 15)

Leafspot, determined by Johnson to be non-parasitic although Alternaria sp. was present, was reported by Boyd as occurring throughout the flue-cure district of southern Georgia, where it caused a loss estimated at 5 per cent. Boyd states that it was especially important where tobacco followed tobacco, and was most severe on impoverished plants, especially those affected by rootknot, It occurred also as a stalk-spot.

A concentrically zonate spotting of tobacco leaves was reported by Fant as very prevalent in fields in the southeastern portion of North Carolina. A Macrosporium species was associated, but according to Fant there was doubt as to its pathogenicity.

Rust (physiological injury following mosaic). Connecticut.

OTHER DISEASES

Ascochyta nicotiana Pass. ?, leafspot. Material collected in Tennessee in 1924 was determined by Miss Anna E. Jenkins of the Bureau of Plant Industry as probably this fungus, which had apparently not been reported for this country previously.

Aspergillus niger Tiegh., canker, was reported by Anderson as causing occasional bad crops in Windsor and Suffield, Connecticut.

Bacillus carotovorus Jones, hollow stalk, was found in several fields in Connecticut and in one field in Maryland in 1925. A few scattered cases were also reported by Slagg and Major from Canada, in Ontario and Quebec, but only in one field where about 5 per cent of the plants were affected was the injury at all severe.

Bacterium solanacearum EFS., bacterial wilt, reported in destructive form from several counties in Virginia. Evidently more prevalent than usual as a result of the hot, dry season. (Fromme)

Cercospora nicotianae Ell. & Ev., frogeye. Southern Georgia, Florida and Porto Rico. In southern Georgia it was important due to general lack of vigor caused by drought and rootknot, and caused a loss estimated by Boyd at 5 per cent.

Corticium vagum Berk. & Curt. Reported to have been present to a considerable extent in seed beds in New Mexico; also caused damping-off in Wisconsin but was unimportant.

Fusarium oxysporum nicotianae Johnson, wilt, caused considerable injury in local areas in Maryland, where it was more prevalent than usual. (Temple & Jehle)

Phyllosticta nicotianae Ell. & Ev., leafspot, Porto Rico.

Phytophthora nicotianae (Speg.) Van Breda de Haan, black shank, was reported by Boyd from three counties in southern Georgia, and from Florida by Tisdale, who said, "General in appearance, causing reduction in yield of approximately 10 per cent. The acreage of cigar wrapper tobacco this year was only about one-third that of 1924. Most of the plantings were on new land, hence the reduction in loss from black shank."

Pythium debaryanum Hesse, Connecticut and Wisconsin.

Brown rootrot (undet.), occurred in Connecticut. Clinton and Anderson state that experiments have shown that it can be greatly lessened by soil treatment with steam or formalin. Johnson reported from Wisconsin as follows "Tobacco on sod failed to grow properly in about 90 per cent of the cases. The roots frequently rot. Timothy sods are worst. A soil toxin may be concerned. About 20 per cent of the fields in Wisconsin are more or less affected in this manner."

Curly dwarf. A few scattered instances were observed in Ontario, Canada. (Slagg & Major)

Damping-off. "Quite common in the Quebec districts and in parts of the Ontario district. As a result of improved methods of seedbed management in Quebec, the disease was not as prevalent as in previous years." (Slagg & Major)

Frenching (undet.). Serious in a few fields in Housatonic Valley, Connecticut. (Clinton & Anderson)

Injury due to tarvia fumes, a few cases in Connecticut. "Where hot tarvia was applied to roads the fumes blew over on the tobacco leaves and made them appear as if varnished. Spots later developed on some of the leaves." (Anderson)

Lightning injury. About six cases occurred in Connecticut. The plants were killed in spots 15 to 50 feet across. (Clinton & Anderson)

Recent literature:

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2. Cooper, Thomas. Tobacco brown root-rot. Ann. Rept. Director Kentucky Agr. Exp. Sta. 37 (1924): 29-30. 1925.

3. Garner, W. W. A new tobacco disease. Better Crops 4 (4): 17-18. June 1925.

4. Major, T. G. Report on tobacco disease investigations. Canada Dept. Agr. Exp. Farms Tobacco Div. Rept. 1923: 38-41. 1925.

DISEASES OF SUGAR CANE

MOSAIC (UNDETERMINED)

Mosaic was reported from Georgia (loss 2 per cent), Florida, Alabama, Mississippi, Louisiana, Porto Rico, and the Hawaiian Islands in 1925. Louisiana reported more than last year and more than average. Other reports are:

Florida: Causing considerable damage in western part of state. Areas quarantined against movement of diseased material. (Weber)

Georgia: Mosaic is common in the susceptible varieties in Decatur, Grady, Thomas, Colquit, Brooks, Tift, and Worth Counties. Most of the larger plantings for syrup are planted to the resistant varieties. Less important this year than drouth and rootknot. (Boyd)

Mississippi: Mosaic disease of sugar cane continues serious in about 18 counties in south Mississippi. Cayana and several Java seedlings are being imported into the state with the hope of introducing immune varieties for combatting the disease. (Neal)

Hawaiian Islands: Mosaic disease occurs on islands of this group. Of the 43 plantations, however, 21 are commercially free of the disease. Losses of sugar from mosaic disease in the 1925 crop are as follows:

	A maximum estimate
Island of Kauai	50 Tons
" " Oahu	900 "
" " Hawaii	1930 "
" " Maui	1710 "
Total for all Islands	4590 Tons

This is a loss on our total crop of 725,000 tons, or less than seven-tenths of one per cent and about one-half of the estimated losses for the 1920 and 1921 crops which you quoted. We can conservatively say that losses from mosaic disease are on a downward curve in these Islands rather than an upward trend. Much of this reduction in losses from mosaic disease can be attributed to the educational work of Kunkel and Lyon and the extension of areas planted to the varieties H 109 and D 1135, which with us are both resistant to infection and to some degree tolerant of the disease once infected. It is interesting to note that the plantations which grow the extremely susceptible canes are more nearly mosaic free than those which grow the varieties which are more tolerant to the disease. (Lee)

Porto Rico: Very common and in some cases severe. Has been brought under control by roguing and by the use of resistant varieties. (Cook & Tucker)

Recent literature:

1. Alfaro, J. A new method of fighting the propagation of mosaic disease in sugar cane. Plant. & Sugar Manuf. 75: 388-389. Nov. 14, 1925.

2. Altson, R. A. The spread of cane mosaic in the West Indies. (Jour. Bd. Agric. British Guiana.) Intern. Sugar Jour. 27: 293. 1925.

3. Ashby, S. F. Behaviour of some varieties of cane to mosaic disease in the Hawaiian Islands. Trop. Agriculture 2: 132-134. June 1925.

4. ----------- Sugar-cane mosaic. Rept. Proc. Imp. Bot. Conf. London, 1924: 122-131. 1925.

5. Asuncion, S. Mosaic disease and its effect on the sugar industry in the Philippine Islands. Philipp. Agr. Rev. 18: 33-38. 1925.

6. Chardon, C. E. Sobre la enfermedad del 'mosaico' o 'matizado' de la cana de azucar. (On the mosaic disease of sugar cane.) Rev. Agr. Puerto Rico 14: 188-197. 1925.

7. East, Edward M., and Wm. H. Weston. A report on the sugar cane mosaic situation in February, 1924, at Soledad, Cuba. Contribut. Harvard Inst. Trop. Biol. and Med. 1: 1-52. Harvard Univ. Press: Cambridge, 1925.

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9. Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 39-91. 1925.

10. Johnston, J. R. Control of sugar cane mosaic. Plant. & Sugar Manuf. 74: 190-191. March 7, 1925.

11. Kopp, A. La mosaïque de la canne à sucre. Son apparition aux Antilles françaises. Quelques faits nouveaux. Rev. Bot. Appl. 5: 411-417. June 1925.

12. ----------- La mosaïque de la canne à sucre (concl.). Rev. Bot. Appl. 5: 519-526. July 1925.

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15. Shepherd, E. F. S. Mosaic disease serious in Reunion. South African Sugar Jour. 9: 97, 99, 101. 1925.

16. Storey, H. H. Sugar-cane diseases of the mosaic type in South Africa. II. Jour. Dept. Agr. South Africa 10: 532-537. June 1925.

REDROT CAUSED BY COLLETOTRICHUM FALCATUM WENT.

Although reported general from Georgia, Florida, Louisiana, and Porto Rico, redrot was considered relatively unimportant in the growing cane. It continues to cause considerable destruction of planted or windrowed seed cane.

Florida: Most common disease of the cane in Florida, found almost everywhere cane is grown. The damage is slight however. (Weber)

Georgia: Less prevalent in spring due to dry April and May; light infection of canes later in season probably due to dry summer. (Boyd)

Recent literature:

1. Cottrell-Dormer, W. Red rot in sugar cane. Australian Sugar Jour. 16: 734-735, 737. 1925.

ROOTROT DUE TO VARIOUS FACTORS

Rootrot troubles attributed to various causes were reported from Louisiana, Georgia, Porto Rico, and Hawaii in 1925. Some of the organisms which were reported as associated with rootrot are Marasmius sacchari Wakker, Rhizoctonia sp., Pythium sp., Sclerotium rolfsii Sacc., and Thielaviopsis paradoxa (de Seyn.) Hoehn. In Louisiana losses from rootrot were estimated at 5 to 10 per cent. Tims reported that "While damage was not nearly so serious as last year, the disease was still one of the most serious troubles of sugar cane." The importance of root-eating snails and centipedes in connection with rootrot in Louisiana has been brought out by R. D. Rands. In Georgia, according to Boyd rootrots were usually accompanied or followed by redrot and rootknot. From Hawaii Lee reported as follows:

> "The symptoms causing what have been known as Lahaina disease have been found sufficiently distinguishable to identify three different types of Lahaina disease or as it has been sometimes called, root rot.
>
> "The use of the term growth failure is now believed to be preferable to either the term Lahaina disease or root rot. The type of growth failure occurring on the windward slope of acid soils we have called Hamakua growth failure. This type has been shown in pot tests with adequate replications to be non-infectious. The Chemistry Department have shown the presence of a high content of aluminum salts in such soils and pot tests with adequate

replications have shown that aluminum salts can reproduce the growth failure symptoms. One of the plantations has secured remarkable recovery from such aluminum growth failure in field tests by high applications of potash fertilizers to the soil. Similar results are reported by Hoffer in aluminum growth failure of corn. This treatment is also now in plantation practice."

According to the results of investigations in Hawaii mentioned by Lee, and reported by McGeorge (7-10), aluminum and other toxins are a very important factor in the rootrot problem.

Recent literature:

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5. ----------- Enfermedades de la raiz de la cana de azucar. (Sugar cane root diseases.) Rev. Agric. Puerto Rico 14: 245-246. 1925.

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7. McGeorge, W. T. A discussion of the root rot problem. Hawaiian Plant. Rec. 29: 167-173. April 1925.

8. ----------- An illustration of aluminum injury to sugar cane. Hawaiian Plant. Rec. 29: 398-399. Oct. 1925.

9. ----------- The influence of aluminum, manganese and iron salts upon the growth of sugar cane, and their relation to the infertility of acid island soils. Hawaiian Sugar Plant, Assoc. Exp. Sta. Bul. Agr. & Chem. Ser. 49: 95 pp. July 1925.

10. ----------- The root rot problem of sugar cane. Studies in toxic conditions and causes - The relation of potash to disease resistance. Facts About Sugar. 20: 730-732. Aug. 1, 1925.

11. Rands, R. D. Snails as predisposing agents of sugar cane "root disease" in Louisiana. Jour. Agr. Res. 28: 969-970. 1924.

12. ---------- Root disease of sugar cane in Louisiana. U. S. Dept. Agr. Circ. 366: 1-20. 1926.

13. Shepherd, E. F. S. La maladie de la racine de la canne. Rev. Agr. Ile Maurice. 1925: 418-420. March-April 1925.

14. Stewart, G. R. The relation of root injuries to root failure in Lahaina cane. Hawaiian Plant. Rec. 29: 400-409. Oct. 1925.

15. Veret, J. A. The root system of sugar cane. Hawaiian Plant. Rec. 29: 350-358. Oct. 1925.

EYESPOT CAUSED BY HELMINTHOSPORIUM SACCHARI BUTLER

Eyespot was reported to be very destructive on seedlings and on rattoons of some varieties throughout Porto Rico. It is severe on the variety H 109 in favorable situations in Hawaii, according to Lee, who states:

> "Of the commonly grown varieties in these islands all are commercially resistant to eyespot with the exception of H 109. H 109 is, moreover, free of the disease in 85 per cent or more of the areas on which it is planted, but on the northern slopes of all islands, with lessened daylight and consequently very long hours of dew on the leaves, eyespot causes appreciable losses on this one susceptible variety.
>
> "On this variety in weather favorable for the disease, the eyespot lesions run up the leaves, forming broad streaks sometimes to a length of two or three or even four feet. In severe outbreaks the lesions run down into the growing point of the cane and a top rot results. In a few severely affected fieldscounts of sticks affected with such a top rot have been made. In the worst fields observed 38.6 per cent of the stalks had been killed back by top rot. In a more nearly representative field for the affected locality, 13.8 per cent of the stalks showed a top rot. It is for this reason that eyespot, which in most countries and on most varieties, is a disease of almost negligible importance, is with us only secondary to mosaic disease in causing loss of cane and sugar. We do not wish to draw a picture of devastation, however. Only three plantations on the northern slopes of these islands grow H 109 extensively and on these plantations severe infection is confined only to those areas where air movement in the fields is poor and hours of sunlight are short.
>
> "H 109 gives such high yields of sugar per acre that even with small areas affected with eyespot it outyields the resistant varieties at present available under the conditions of these plantations."

Recent literature:

1. Cook, M. T. Studies on Helminthosporium sacchari on sugar cane in Porto Rico. (Abstract) Phytopath. 16: 71. Jan. 1926.

2. Halma, F. F., and H. S. Fawcett. Relation of growth of Helminthosporium sacchari to maintained temperatures. Phytopath. 15: 463-469. 1925.

ROOTKNOT CAUSED BY HETERODERA SP.

Boyd reported rootknot from Georgia as follows:

> "The root disease survey was not started until the latter part of October. A surprising amount of rootknot was met with in both the severely and lightly drought-affected areas. Where there existed heavy, more or less uniform infestation of the soil, the entire field would show marked stunting. Fields with only spotted infestation could be recognized easily by the local stunted spots of cane. The most severe case seen was in a one-acre field in Worth County, which was a total loss for syrup. This field was in a creek bottom with more than the usual amount of moisture available throughout the summer, yet the cane grew no more than 2 to 4 feet high. The soil is loose and sandy, with a heavy nematode infestation, judging from the severe infection of cotton on three sides of the cane field. This was the first time cane had been planted there. Numerous hills of Cayana 10 scattered throughout the field attained nearly normal height. The severely affected variety was the so-called 'Red' cane. The galls ranged in size from minute knots on the fine fibrous roots to enlargements one-fourth inch in diameter on the larger roots. The galls of more recent development were gorged with larvae, eggs, and females in various stages of development. Males were less common. The species is undoubtedly H. radicicola."

Heterodera sp. causing rootknot was reported from Porto Rico by Matz (see references), who has found it occurring in loose more or less sandy soils in widely separated areas in southern Porto Rico since the summer of 1924.

Recent literature:

1. Matz, J. Root knot of sugar cane in Porto Rico. Disease associated with nematode infestation found in sandy soils of Island's south coast. Facts About Sugar 20: 1193-1194. Dec. 12, 1925.

2. ----------- Root knot of sugar cane in Porto Rico. Phytopath. 15: 559-563. 1925.

3. Matz, J. Root knot on sugar cane in Porto Rico. Plant.& Sugar Manuf. 76: 9. Jan. 2, 1926.

OTHER DISEASES AND INJURIES

Bacterium vascularum Cobb, gumming disease, occurred in a few localities in Porto Rico.

Cercospora vaginae Krueger, red spot of leaf sheath, was reported from Porto Rico.

Gnomonia iliau Lyon, iliau. Hawaii (negligible).

Leptosphaeria sacchari van Breda de Haan, ringspot, was said to be common in Florida during the fall, causing considerable firing of the older leaves. In Porto Rico and Hawaii it was reported to be unimportant.

Melanconium sacchari Mass., rind disease. Louisiana and Porto Rico.

Phyllosticta sacchari Speg., leafspot. Porto Rico.

Phytomonas rubrilineans Lee et al., bacterial red stripe, is reported from Hawaii (7). The disease is similar to that caused by Bacterium panici Elliott on proso millet in the United States, but inoculations with each organism on the host of the other gave only negative results. Concerning its occurrence in 1925, Lee makes the following statement:

> "This disease which had previously been known only in a small district on the Island of Hawaii, has been found during 1925 on the Island of Kauai and has apparently existed there for several years. Under the dry conditions of the irrigated plantations where it occurs, it was so negligible as to escape attention by the plantation staffs. The Tip varieties are the only susceptible varieties grown in these islands. It is so widespread on Kauai and of such negligible importance there that eradication was decided against. The disease has not yet been observed on the Islands of Oahu or Maui."

Thielaviopsis paradoxa (de Seyn.) Höhn., pineapple disease. Porto Rico (common but not serious); Hawaii (negligible).

Drought injury. "Caused the greatest loss in years in Georgia, yet where the land was prepared and cultivated best, the crop made surprising progress. Many fields, however, are practically a total loss for syrup and are used for fodder and grazing. A large percentage of the apparently well developed cane is pithy. Probable loss, around 40 per cent." (Boyd)

Non-parasitic diseases occurring in Hawaii were reported by Lee, as follows: (see also root rot):

> "Of the non-infectious diseases there are two types of chlorosis, one occurring on cane of all ages on limestone soils, and the other on young ratoons. The second type is being prevented by prompt irrigation following harvesting and early nitrogen applications. The first type is being alleviated by iron sulphate dust applications, and this method is being used commercially. There have been but negligible losses from both types of chlorosis during the past year.
>
> "A non-infectious disease of cane called Pahala blight, which occurs on only one plantation on a leeward arid slope

has been effectively controlled by the Chemistry Department here, with sulphur applications to the soil; also the cane is found to recover following applications of manganous sulphate as a dust. These results with one or two other clues point to the inference (inference only) that a manganese deficiency is the cause of this Pahala blight, analogous to the manganese deficiencies produced in cultures by McHargue in Kentucky."

Recent literature:

1. Ashby, S. F. Three serious cane diseases not yet reported from the British West Indies. Proc. West Indian Agr. Conf. 9 (1924): 84-89. 1925.
Gumming, Fiji disease, leaf stripe (Sclerospora).

2. Barber, C. A. Streak disease on Uba cane in Natal. Intern. Sugar Jour. 27: 472-479. Sept. 1925.

3. Cook, M. T. Enfermedades de la mancha de la hoja de la cana de azucar. (Leafspot diseases of sugar cane). Rev. Agr. Puerto Rico 14: 185-187. 1925.

4. ---------- Leaf spot diseases of sugar cane. Nature of leaf spot infections and their causative organisms. The principal leaf spot diseases. Facts About Sugar 20: 234. March 7, 1925.

5. ---------- Sugar production and cane diseases. Extent of losses from disease inadequately realized - Economic effects of reduced production. Facts About Sugar 20: 1068-1069. Nov. 7, 1925.

6. Dodds, H. H. Treatment of streak and mosaic diseases. South African Sugar Jour. 9: 593-599. Sept. 1925.

7. Hawaiian Sugar Planters' Association - Experimental station - Dept. Plant Path. Red-stripe disease studies. Honolulu, Sept. 1925.
Articles by H. A. Lee, J. P. Martin, Helen A. Purdy, C. C. Barnum, W. C. Jennings, and D. M. Weller.

8. Lee, H. A., J. P. Martin, and C. C. Barnum. A report on mechanical methods in dusting cane fields. Hawaiian Plant. Rec. 29: 377-384. Oct. 1925.

9. Storey, H. H. Streak disease, an infectious chlorosis of sugar-cane, not identical with mosaic disease. Rept. Proc. Imp. Bot. Conf. London, 1924: 132-144. 1925.

10. ---------- Streak disease of sugar-cane. Plant. & Sugar Manuf. 75: 168-169. Aug. 29, 1925.

11. ---------- Streak disease of sugar-cane pt. II. Plant & Sugar Manuf. 75: 188-191. Sept. 5, 1925.

12. Storey, H. H. Streak disease of sugar-cane. Sci. Bul. Dept. Agr. South Africa 39: 39 pp. 1925.

13. Yoder, P. A. Hot-water treatment of dormant and sprouted seed cane. Intern. Sugar Jour. 27: 359-361. 1925.

14. ---------- Hot-water treatment of dormant and sprouted seed cane. U. S. Dept. Agr. Circ. 337: 1-3. 1925.

DISEASES OF SUGAR BEET

CURLY-TOP (UNDETERMINED)

Collaborators reported the following percentages losses from curly-top: New Mexico, 20; California, 15; Idaho, 8; Washington, 5; and Arizona, a trace.

Eubanks Carsner of the Bureau of Plant Industry has submitted the following statement concerning the importance of curly-top in 1925:

> "In regard to the beet disease situation in California and the intermountain region of the Northwest, I may say that taking the situation as a whole curly-top was again by far the most serious disease during the past season. This despite the fact that in Idaho and Utah where last year the damage was enormous, the crop this year was less affected than has been true for a number of years. In California the season of 1925 was the most serious for curly-top that has been experienced for many years. The central part of the state especially was affected, and the delta region of the San Joaquin and Sacramento Rivers experienced such a bad outbreak that the yield was reduced from that of previous years by more than 50 per cent. This region has heretofore been relatively free from the disease even in seasons when it was severe elsewhere in the state."

Carsner has reported that some progress has been made in the selection of sugar beets for curly-top resistance (2).

Recent literature:

1. Carsner, Eubanks. Spring infection of sugar-beet leafhoppers with curly top virus. U. S. Dept. Agr. Official Record 4 (34): 3. Aug. 26, 1925.

2. ---------- Resistance in sugar beets to curly-top. (Abstract) Phytopath. 16: 87-88. Jan. 1926.

3. ---------- and C. F. Stahl. Studies on curly top disease of the sugar beet. Facts About Sugar 20: 230-233, 254-256, 278-280, 281. 1925. (Reprinted from Jour. Agr. Res. 28: 297-320. April 26, 1924).

4. Carsner, Eubanks. Attenuation of the virus of sugar beet curly top. Phytopath. 15: 745-757. Dec. 1925.

NEMATODE, HETERODERA SCHACHTII SCHMIDT

The following losses were estimated by collaborators to have been caused by the sugar-beet nematode in 1925: New Mexico and California, 5 per cent; Arizona one per cent; Idaho, a trace.

The present distribution of the sugar beet nematode as determined by Gerald Thorne (Office of Sugar Plant Investigations; 6) is as follows:

> "California: The principal beet-growing areas adjacent to the following sugar factories are generally infested: Chino, Los Alamitos, Santa Ana, Los Angeles, Oxnard, Betteravia, Spreckels, and Salinas. A few fields are known to be infested near Lompoc, Alvarado, and Pleasanton.
>
> "Utah: Many fields are infested in the territory supplying the factories at Smithfield, Lewiston, Logan, Brigham, Ogden, Hooper, West Jordan, Lehi, Springville, Spanish Fork, Salt Lake City, Provo, and Payson, while a few infestations are known at Cornish, Garland, Layton, Moroni, and Richfield.
>
> "Idaho: A few infested fields are known near Sugar City, Idaho Falls, Preston, and Blackfoot. The territory supplying the Whitney factory is generally infested.
>
> "Colorado: No part of this state is seriously infested. In the northern section about 175 fields are known to be, distributed among the following factory districts: Fort Collins, Windsor, Eaton, Greeley, Loveland, Longmont, Fort Morgan, Brush, Julesburg, and Sterling. In the Arkansas Valley scattering infestations are known at many points between Pueblo and the Kansas line with the greater numbers at Vineland, Avondale, Manzonola, Rocky Ford and Sugar City.
>
> "Nebraska: Only two fields in this state are known to be infested. These are located in Gering.
>
> "Montana: A single infested field is located near the Billings factory."

Thorne predicts that unless precautionary measures are taken the entire western beet growing districts will become infested with the parasite. Steiner (3) records some interesting observations and deductions regarding the host preferences and host selection mechanism of this and other plant-parasitic nemas. The host preference of a particular nema "population" is determined by the previous host history, the plant on which the parents lived being preferred more and more strongly as the number of generations of specialization increases.

Buckhurst (1), and Strachan and Taylor (4), report that an eelworm very similar to if not identical with *Heterodera schachtii* is of some importance on potatoes in England, where it is called "potato eelworm" and has been paid increasing attention during the past ten years. Some preliminary experiments conducted by Buckhurst on a very small scale indicated that this particular race would not attack beets.

It is reported that in Utah *H. schachtii* has been found to be attacked

by several species of predacious and parasitic nematodes (5).

Recent literature:

1. Buckhurst, A. S. Notes upon bulb mites and eelworms. Jour. Min. Agr. Great Britain 32: 734-738. Nov. 1925.

2. Semichon, L. Sur l'anguillule de la betterave: Heterodera schachtii, Schmidt, dans les tubercles provenant du Maroc. Rev. Path. Veg. & Entom. Agr. 12: 40-43. Jan.-Mar. 1925.

3. Steiner, G. The problem of host selection and host specialization of certain plant-infesting nemas and its application in the study of nemic pests. Phytopath. 15: 499-534. Sept. 1925.

4. Strachan, J., and T. H. Taylor. Potato eelworm. Jour. Min. Agr. Great Britain 32: 941-947. Jan. 1926.

5. Taylor, W. A. Report of the Chief of the Bureau of Plant Industry for the fiscal year ended June 30, 1925. 36 pp. 1925.

6. Thorne, Gerald. The control of the sugar beet nematode. U. S. Dept. Agr. Farmers' Bul. (In press)

LEAFSPOT AND ROOTROT CAUSED BY PHOMA BETAE (OUD.) FRANK

Losses reported as due to Phoma betae in 1925 are: Idaho, 2 per cent; Wisconsin, one per cent; Louisiana (leafspot), Kansas (leafspot), and Washington each a trace. Reports of its occurrence were received from Ohio, Minnesota, and California also. Undoubtedly Pythium, Rhizoctonia and perhaps other fungi are concerned also in the losses reported as due to rootrot.

Louisiana: Phoma betae leafspot appeared in the planting of sugar beets on the University Experiment Station farm, and was quite severe on May 20. This is probably the first report of this disease in Louisiana. (Edgerton & Tims)

Ohio: In a general survey of the sugar beet section of the state it was found that black root was quite generally distributed and causing heavy losses. On the 50,000 acres originally planted to sugar beets, 5,000 to 8,000 have been replanted to other crops, largely on account of Phoma. The unfavorable growing conditions during May and June were partially responsible for the severe epidemic. However, the disease is becoming more severe from year to year and at present in some sections no attempt is being made to grow sugar beets. In a careful check-up, it was found that the epidemic did not have its source on the seed. (Plant Pathologists of Agr. Exp. Sta. for Northern Ohio, August).

California: A rootrot, which is probably due in the main to Phoma, was noted in several fields in the vicinity of Santa Ana, and in these caused considerable damage. (Carsner).

Most of the references given below discuss beet seed-treatment, mostly for the control of rootrot, with various substances, including mercuric chloride (6), sulfuric acid (6, 9), formalin (5), copper sulfate (5, 6), segetan (4), betanal (1, 2, 4), uspulun (2, 4, 5), and germisan (2, 4, 5, 8).

The occurrence of the disease in Utah has been found to be correlated with drought late in June and July, according to Richards (7). Rambousek (6) concludes that the disease as it occurs in Czecho-Slovakia is associated with a type of soil that contracts during periods of drought. He states, also, that heart rot is always accompanied by bacteria, principally Micrococcus spp., and that attempts to reproduce it with pure cultures of P. betae were failures, although the leaves and young seedlings were inoculated readily. Gäumann (3), working in Switzerland, reports the results of experiments and observations from which he concludes that the cause of heart rot is primarily physiological and secondarily parasitic. He states that P. betae is capable of infecting only plants grown on markedly alkaline soils (pH 7.8). Negative results only were secured in inoculations on plants grown in soil at pH 6.6. The disease was in no case observed to occur on acid soils.

Recent literature:

1. Baunache. Pflanzenschutzmittel u. -geräte. Betanal. Die Kranke Pflanze 2: 103-104. 1925.

2. Esmarch. Der Wurzelbrand der Rüben. Die Kranke Pflanze 2: 62-64. 1925.

3. Gäumann, E. Untersuchungen über die Herzkrankheit (Phyllonekrose) der Runkel- u. Zuckerrüben. Vierteljahrsschr. Naturforsch. Ges. Zürich 70, Beibl. 7: 106 pp. 1925.

4. Kotthoff, P. The influence of sugar ball treatment upon the yield of the sugar beet. (Transl. title). Landwirtschaftliche Zeitung, No. 15, April 1925, pp. 190-191.

5. Neuweiler, E. Bericht uber die Tätigkeit der Schweizerischen Landwirtschaftlichen Versuchsanstalt Oerlikon in den Jahren 1920-1923. LV. Pflanzenschutz. Landw. Jahrb. der Schweiz 39: 252-260. 1925.

6. Rambousek, F. Berichte des Forschungs-Institutes der csl. Zucker-industrie. CDXVII. Die Rubenkrankheiten in der Cechoslovakei 1923. Zeitschr. Zuckerind. (Prague) 49: 197-201. 1925.

7. Richards, B. L. Plant pathology. In Utah Agr. Exp. Sta. Bul. 192 (Bienn. Rept. Director 1923/24): 58-61. 1925.

8. Winterhalter, W. K. Treatment of beet seed. The use of germisan to prevent disease and stimulate growth. Facts About Sugar 20: 329. April 4, 1925.

9. Zwoboda, and H. Bauer. Ein Beitrag zum Beizen des Zuckerrubensamens nach dem Verfahren von Hiltner. Zeitschr. Zuckerind. (Prague) 49: 207-209. 1925.

ROOTROT CAUSED BY RHIZOCTONIA SP.

The Rhizoctonia rootrot (dry rot, crown rot) was reported to the Survey only from Ohio, Kansas, and Colorado in 1925. In Kansas, according to White, its occurrence was general, but it caused only a trace of loss. In Ohio it was noted to be most severe on acid soils. Stewart (Office of Sugar Plant Investigations) reported that in Colorado "In some fields the loss was 77 per cent, and many fields showed 25 per cent. Rhizoctonia was the only organism constantly associated with rot in the Rocky Ford district."

LEAFSPOT CAUSED BY CERCOSPORA BETICOLA SACC.

According to G. H. Coons, the Cercospora leafspot caused a loss of 3 per cent in Colorado in 1925. Other percentage losses reported were: Iowa, 2; Wisconsin, 1; Louisiana, Kansas, and Idaho, traces. The disease was reported also from Ohio, Wisconsin, and California.

Colorado: Slightly less prevalent than usual, less than last year. Epidemic in the Arkansas Valley, but unimportant elsewhere. Temperature conditions are always favorable in Colorado. It caused greatest injury between August 15 and September 15, when the beets were approaching maturity. In a test of nearly 500 strains no commercial variety or strain showed any resistance or tolerance. (Coons)

California: Cercospora leafspot was noted only in southern California. It caused less damage than it has in other years. (Carsner)

OTHER DISEASES

Actinomyces scabies (Thax.) Güssow. Scab occurred in Idaho, but was unimportant, according to Hungerford.

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb) The rootknot nematode caused a loss of 2 per cent in California, according to Milbrath.

Sclerotium rolfsii Sacc. Louisiana.

Septoria betae West. Septoria leafspot was of considerable importance in Ohio, according to H. C. Young.

Mosaic (undet.) was reported by Durrell to be prevalent in some fields in the Arkansas Valley in Colorado.

Recent literature:

1. Salmon, E. S., and W. M. Ware. Downy mildew of mangold and beet. Jour. Min. Agr. Great Britain 32: 833-838. Dec. 1925.

Sugar beet culture is becoming of increasing importance in Great Britain. The first authentic record of this fungus in the country was on sugar beet in 1921. It is capable of causing considerable damage if allowed to become established.

DISEASES OF OTHER CROPS

ARTICHOKE (JERUSALEM)

Powdery mildew (undet) was reported from Indiana.

ASPARAGUS

RUST CAUSED BY PUCCINIA ASPARAGI DC.

Rosa sent the following report from California:

> "Rust was much more severe than usual in 1925. There was a severe outbreak in the Delta and Sacramento River districts, especially on young plantations that were not cut later than April 1. The reduction in yield will be evident next year and in succeeding years. There was probably 15 per cent gross injury. The Washington strains proved somewhat resistant but by no means immune, while Palmetto and Argenteuil were very susceptible."

Milbrath reported a loss of 2 per cent for California, but stated that the injury would be difficult to estimate until the 1926 crop.

The disease was said by Fenner to be important locally in South Carolina on spring-sown seedling plants. In other states reporting it rust was of no importance. Nelson stated that in Michigan, "Rust appeared late this year in susceptible varieties and caused no great damage. Washington strains were not affected at all." A similar report was received from New Jersey.

OTHER DISEASES AND INJURIES

Cercospora caulicola Wint., Florida.

Rhizoctonia sp., stem rot, South Carolina.

Sclerotinia spp., rot. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

Alkali injury, Washington.

BEET (GARDEN)

Leafspot caused by Cercospora beticola Sacc. was rather generally reported from the eastern and southern states but was not very important. It was also reported from Porto Rico.

Scab caused by Actinomyces scabies (Thax.) Gues. was reported from New Jersey, Virginia, and Washington.

Rootknot caused by Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb) was said by Taubenhaus to be prevalent in light sandy loams, causing a loss of one per cent, in Texas. White reported that one field in Kansas was a total loss due to this disease. Peaches on the same land had been killed by rootknot in 1924.

Leafspot caused by Phoma betae (Oud.) Frank was common in New York, according to Felix.

Rootrot caused by Rhizoctonia sp. was observed to be serious in one garden in Floyd County, Indiana. (Gardner)

Damping-off (Pythium sp. ?). "Fall crop in Western Branch (Norfolk Suffolk) section of Virginia frequently attacked." (McWhorter)

Stemrot caused by Sclerotium rolfsii Sacc. Texas.

Damping-off (undet.). Virginia (McWhorter), Washington.

C A R R O T

Rot caused by Sclerotinia sclerotiorum (Lib.) Mass. was reported by Chupp from New York as follows, "Abundant during the latter part of the season, worse on early carrots pulled late. Soil moisture conditions were ideal for its development. According to Felix, carrots provided ideal conditions for apothecial production and the formation of new sclerotia, and the length of time this crop remains in the field is thought to be a big factor in controlling the disease."

Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

Leafspot caused by Cercospora apii carotae Pass. New York, "Probably part of the leaf blight which is supposed to be due to Macrosporium is Cercospora. It never does much injury in this state." (Chupp). Gardner reported it as serious locally in Indiana.

Softrot caused by Bacillus carotovorus Jones was reported from Connecticut, "One report; caused considerable injury after wet weather in this field." (Clinton), and New York, where it was common in some storage houses, according to Chupp.

Black rot caused by Alternaria radicina Meier, Drechs., & Eddy was common in New York on carrots in storage. (Chupp).

Stemrot caused by Corticium vagum Berk. & Curt. Common in some fields in New York. (Chupp).

Rootknot caused by Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb). Missouri, Washington.

Leaf blight caused by Macrosporium carotae Ell. & Langl. New York, Porto Rico.

Rot caused by Sclerotium rolfsii Sacc. Louisiana.

C A S S A V A

Leafspot caused by Cercospora sp. Porto Rico.

EGGPLANT

LEAFSPOT AND FRUIT ROT CAUSED BY PHOMOPSIS VEXANS (SACC. & SYD.) HARTER

Both the leafspot and the fruit rot were reported from southern Georgia, Florida, Iowa, and Porto Rico; the leafspot only from Massachusetts, and Tidewater Virginia; and the fruit rot only from New Jersey, Kansas, and Arizona. Losses reported were 15 per cent in Georgia, 5 per cent in Maryland, 2 per cent in Arizona, and a trace in Iowa.

<u>New Jersey:</u> Dusting with copper-lime after fruit rot started failed to check the disease. (Haenseler).

<u>Georgia</u> (southern): General in Coastal Plain, very important in some fields especially under irrigation. Most severe in low fields near creeks, and under irrigation. No disease until after drought broke in June. (Boyd)

<u>Florida:</u> Infection by this fungus has been found in 100 per cent of the fields, in a majority of them being from 90 to 100 per cent. This is the worst disease of eggplants in the state, not only causing considerable damage to the foliage, but also affecting a large percentage of the fruit and causing losses both in the field and in transit. (Weber)

OTHER DISEASES

<u>Verticillium alboatrum</u> Reinke & Berth., wilt. Chupp reported from New York, "In many parts of the state very few eggplants are found, because of this disease. It is very common on the Black Beauty variety, and is most serious in Monroe and Schenectady Counties. In Niagara County the Florida High, which seems resistant, is grown." In New Jersey, according to Haenseler, "Heavy green manures plus sulfur to acidify the soil gave a partial control." The disease was reported also from Virginia and Ohio.

<u>Bacterium solanacearum</u> EFS., bacterial wilt, was reported from South Carolina, Florida, and Porto Rico. Weber stated that in Florida, "This wilt was found in practically all eggplant fields visited. The loss amounts to 2 per cent. The plants are usually killed before any marketable fruit develops."

<u>Mosaic</u> (undet.) was reported from Florida and Indiana, and McWhorter reported a "mosaic-like chlorosis" from Virginia. In Indiana, "The disease was noted on a few plants in a rather large plot near badly infected tomatoes," according to Gardner. Weber reported that in Florida mosaic was found on about 70 per cent of the wild eggplant (<u>Solanum floridanum</u>) growing in waste places, but it was not important on the cultivated plant.

Elmer (1) found that mosaic could be transmitted from eggplant to cowpea.

<u>Alternaria solani</u> (Ell. & Mart.) Jones & Grout, early blight, New York, Florida.

<u>Corticium vagum</u> Berk. & Curt., damping-off, Connecticut, Virginia.

<u>Phyllosticta hortorum</u> Speg., leafspot, Florida.

<u>Wilt</u> (undet.). Serious locally in Indiana. (Gardner)

Recent literature:

1. Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 39-91. 1925.

2. Ocfemia, G. O. The Phytophthora disease of eggplant in the Philippine Islands. Philipp. Agr. 14: 317-328. Nov. 1925.
Caused by Phytophthora melongenae Sawada; known in the Philippines since 1918. At times has caused considerable damage to the fruits. Has been reported only from Japan and the Philippines.

E N D I V E

Softrot caused by Bacillus carotovorus Jones, serious in several cases in eastern Massachusetts. (Osmun & Davis)

Crown rot caused by Botrytis sp., was very common in storage and caused much loss, as much as 20 to 30 per cent, in New York. (Chupp)

Rot caused by Sclerotinia spp. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

G A N D U L E (P I G E O N P E A)

The following diseases were reported from Porto Rico:

Leafspots caused by Cercospora instabilis Rangel, Phyllosticta sp., and Vellosiella cajani Rangel.

Anthracnose caused by Colletotrichum cajani Rangel.

Rust caused by Uromyces dolicholi Arth., common.

Damping-off caused by Rhizoctonia ferruginea Matz.

Collar rot, and galls, undet.

G I N S E N G

Blight caused by Alternaria panax Whetzel was reported from Michigan, "One large grower sent in one-year old roots with well-developed lesions at the crown and reported many thousand similarly affected" (Nelson), and West Virginia.

Rootrot caused by Armillaria mellea (Vahl) Quel., Washington.

Rot caused by Phytophthora sp., Washington.

H O P

Downy mildew caused by Pseudoperonospora humuli (Miyabe & Takah.) Wils. Salmon and Ware (2-5) report that this disease is becoming of considerable economic importance to hop growers in England. It was at first thought to

have been introduced from either the United States or Japan, but it is now believed to be native to England.

Powdery mildew caused by Sphaerotheca humuli (DC.) Burr., New York.

Recent literature on hop diseases:

1. Korff. Dem Hopfenbau drohende Gefahren. Prakt. Blätter Pflanzenbau und Pflanzenschutz 3: 56-58. 1925.

2. Salmon, E. S., and W. M. Ware. The downy mildew of the hop. Jour. Min. Agr. Great Britain 31: 1144-1151. March 1925.

3. -------------------- The downy mildew of the hop and its epidemic occurrence in 1924. Ann. Appl. Biol. 12: 121-151. May 1925.

4. -------------------- On the presence of a perennial mycelium in Pseudoperonospora humuli (Miyabe & Takah.) Wils. Nature 116: 134-135. 1925.

5. -------------------- New facts concerning the downy mildew or 'spike disease' of the hop. Jour. Kent Farmers' Union 19: 21-22. 1925.

6. -------------------- Virus diseases and the grafting of the hop. Gard. Chron. III, 77: 320-322. May 9, 1925.
   Nettle-head and mosaic.

7. Salmon, E. S., and H. Wormald. Diseases of the hop crop. (ex 'Cultivation, diseases, and insect pests of the hop crop'). Min. Agr. Misc. Publ. 42: 41-58. 1925.

M A N G E L

Leafspot caused by Cercospora beticola Sacc. caused serious damage in Dutchess County, New York (Chupp); also reported from Louisiana.

Downy mildew caused by Peronospora schachtii Fckl. Salmon, E. S., and W. M. Ware. Downy mildew of mangold and beet. Jour. Min. Agr. Great Britain 32: 833-838. Dec. 1925. First reported occurrence in Great Britain in 1921 on sugar beet. Outbreak in 1925 on mangold. Sugar beet culture is becoming of increasing importance in Great Britain and the disease should not be allowed to become established, since it is capable of causing serious damage.

Rhizoctonia sp., Washington.

Bacterial soft rot, Washington.

O K R A

Rootknot caused by Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb) caused losses estimated at 5 per cent in southern Georgia and one-half per cent in Texas, and was said to be locally severe in South Carolina and Arizona.

Wilt caused by Fusarium vasinfectum Atk. Delaware (first observation, Adams), southern Georgia (General in Coastal Plain - Boyd), Texas.

Leafspot caused by Cercospora hibisci Tr. & Earle, Porto Rico.

Rootrot caused by Ozonium omnivorum Shear, prevalent in the black lands of Texas, loss 1 per cent (Taubenhaus).

Rootrot caused by Rhizoctonia sp., Texas.

P A R S L E Y

Drop caused by Sclerotinia sclerotiorum (Lib.) Mass. "Truckers in Tidewater Virginia have reported considerable loss from this disease." (McWhorter)

Late blight caused by Septoria petroselini Desm., New Jersey.

P A R S N I P

Leaf blight caused by Cercospora apii pastinacae Farl. was reported from Connecticut, New Jersey, and Indiana.

Leafspot caused by Cercosporella pastinacae Karst., common in New York, loss trace to 2 per cent. (Chupp).

Leafspot caused by Ramularia pastinacae (Karst.) Lindr. & Vester. New York, Indiana (serious locally - Gardner).

Rootknot caused by Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb), Kansas "Total loss in field reported. Peaches on the same land in 1924 were killed." (White)

Rot caused by Sclerotinia spp. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

P E A N U T

Leafspot caused by Cercospora personata (Berk. & Curt.) Ell. & Ev. was apparently less important than usual. It was reported from southern Georgia, Florida, Louisiana, and Porto Rico. Boyd reported a loss of one per cent in Georgia and stated that its failure to develop as usual was due probably to the generally dry weather.

Rootrot caused by Ozonium omnivorum Shear, prevalent in the black lands of Texas (Taubenhaus).

Rust caused by Uredo arachidis Lagh., Porto Rico.

Chlorosis due to excess of lime, Texas.

Rosette (undet.). Storey, H. H., and A. M. Bottomley. Transmission of a rosette disease of the ground nut. Nature. 116: 97-98. 1925. Virus disease; has caused considerable loss in South Africa.

P E P P E R

Black spot caused by Alternaria sp. or Macrosporium sp. was reported

from New York, New Jersey, eastern Virginia (accompanying Colletotrichum - McWhorter), Florida (Macrosporium commune Rab. - Weber), Missouri, and New Mexico (loss 4 per cent - Crawford).

Bacterial wilt caused by Bacterium solanacearum EFS. was reported from Texas and Porto Rico.

Bacterial spot caused by Bacterium vesicatorium Doidge was rather widely distributed in Florida but not especially important except on fall plantings in Manatee County, where it caused considerable defoliation and fruit spotting. (Weber).

Leaf blotch caused by Cercospora capsici Heald & Wolf was said by Weber to be the most common and most severe disease of the host in Florida, occurring throughout the state and in many localities causing serious losses through defoliation. It was also reported from Texas and Porto Rico.

Soft rot caused by Choanephora cucurbitarum (Berk. & Rav.) Thax. was reported from Florida.

Damping-off caused by Corticium vagum Berk. & Curt. Connecticut, "Mostly on flats in greenhouses or hotbeds in early part of the season. Peppers seem to suffer most." (Clinton & Wilkinson)

Fruit rot caused by Corticium vagum Berk. & Curt. Florida, on fruits touching the ground, not common. (Weber)

Fruit rot caused by Fusarium sp., common in Florida. (Weber)

Wilt caused by Fusarium sp. was reported from eastern Virginia (probably Fusarium, not investigated; occurred where peppers followed tomatoes - McWhorter), Arizona (loss 3 per cent - Streets), and Porto Rico.

Wilt caused by Fusarium annuum Leonian was very destructive to Chile peppers in New Mexico, causing a loss estimated by Crawford at 20 per cent. Crawford stated that a 12-day irrigation schedule reduces the amount of wilt.

Anthracnose caused by Glomerella piperata (Ell. & Ev.) Spauld. & Schrenk (Colletotrichum nigrum Ell. & Halst.; Gloeosporium piperatum Ell. & Ev.) was reported from eastern Virginia, Florida, Kansas, and Porto Rico. McWhorter stated that Colletotrichum nigrum is the most common rot of peppers in Tidewater Virginia.

Bertus, L. S. A fruit rot of chillies. Yearbk. Dept. Agr. Ceylon 1925: 47-50. 1925.

Rootknot caused by Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb) was reported from southern Georgia, Florida, and New Mexico. Boyd reported from Georgia, "Rootknot was of slight importance, occurring mostly in home gardens, and especially on the fall crop half grown. The loss is estimated at 2 per cent." Crawford estimated a loss of 8 per cent to Chile peppers in New Mexico.

Rootrot caused by Ozonium omnivorum Shear, Texas.

Rootrot caused by Pythium sp., Porto Rico.

Watery soft rot caused by Sclerotinia sclerotiorum (Lib.) Mass. Fruit rot occurred sparingly on the fall crop in western Florida. During the early spring the disease caused serious rotting of the stems, leaves, and fruits on the lower east coast. (Weber)

Blight caused by Sclerotium rolfsii Sacc. Weber reported from Florida, "Most of the trouble during the fall has been along the west coast on the fruits. Whenever they come in contact with the soil they are attacked by the fungus, which causes a rapid rot. Stem girdling has also been common over the state in general." The disease was reported also from Georgia, where Boyd estimated a loss of one per cent, and from Porto Rico.

Fruit rots caused by Botrytis sp., Rhizopus sp., and Cladosporium sp. were reported from Washington.

Mosaic (undet.) was reported from New Jersey, Florida, Ohio, Indiana, Kansas, and New Mexico. Gardner stated that it was serious in market gardens in Indiana; otherwise, although said to be common in some cases, it was not important.

Blossom-end rot (non-par.). Higgins, B. B. Blossom-end rot of pepper (Capsicum annuum L.). Phytopath. 15: 223-229. 1925.

Damping-off (undet.). New York.

RHUBARB

CROWN ROT CAUSED BY PHYTOPHTHORA SPP.

Crown rot caused by Phytophthora sp. was reported from Kansas. White stated that "In a planting at Wichita, 8 plants were left out of 50 set. The disease corresponds to Beach's description of crown rot. Isolations yielded Phytophthora sp."

Crown rot caused by Phytophthora cactorum (Leb. & Cohn) Schroet. Beach (1) reports that copper-lime dust may be used to control this crown rot, also that early setting helps to prevent it.

Foot rot caused by Phytophthora parasitica rhei Godf. was reported by Tims to be severe in a small area at Baton Rouge, Louisiana. It has not been reported from Louisiana previously.

Leonian (2) includes P. parasitica rhei in P. omnivora D By.

Recent literature:

1. Beach, W. S. Crown rot of rhubarb. In Pennsylvania Agr. Exp. Sta. Bul. 196 (Ann. Rept. Director 38, 1923/24): 16. July 1925.

2. Leonian, Leon H. Physiological studies on the genus Phytophthora. West Virginia Agr. Exp. Sta. Sci. Paper 11. Reprinted from Amer. Jour. Bot. 12: 444-498. July 1925.

OTHER DISEASES

Leafspot caused by Ascochyta rhei Ell. & Ev. was reported from Connecticut, New York, and New Jersey.

Gray mold rot caused by Botrytis sp. Michigan "Very troublesome in forcing houses. Often very destructive where sanitation and ventilation do not receive proper consideration." (Nelson)

Downy mildew caused by Peronospora jaapiana Magn. Birmingham, W. A. "Downy mildew" of rhubarb. Peronospora jaapiana, Magn. Agr. Gaz. New South Wales 36: 288-290. 1925.

Leafspot caused by Phyllosticta straminella Bres. New York.

ROSELLE

Powdery mildew caused by Microsphaera euphorbiae (Pk.) Berk. & Curt., Florida.

Root disease caused by Rhizoctonia sp., Porto Rico.

SALSIFY

White rust caused by Albugo tragopogonis (DC.) S. F. Gray, New York, Michigan, Washington.

Rot caused by Sclerotinia spp. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

SCHAFF (RUMEX ACETOSA)

Leafspot caused by Gloeosporium rumicis Ell. & Ev. "Found on Long Island, New York, where the host (called schaff) is grown for greens." (Chupp)

Mosaic (undet.). New York, probably statewide. (Chupp)

SISAL

Anthracnose caused by Colletotrichum agaves Cav., Porto Rico.

SPINACH

DOWNY MILDEW CAUSED BY PERONOSPORA EFFUSA (GREV.) CES.

Downy mildew was evidently more important than usual. It was reported to be destructive in Connecticut, Virginia, South Carolina, Louisiana, Texas, New Mexico, and Manitoba, and in some other states was serious locally in some plantings. The reports from Delaware, Louisiana, and Manitoba stated that the disease had not been observed previously in those sections. New York, New Jersey, Kansas, and Washington also reported its occurrence.

Losses reported as due to downy mildew were 10 per cent in Connecticut, 8 per cent in Texas, 7 per cent in New Mexico, about 3 to 5 per cent in South Carolina, and a trace in Kansas.

Following are quotations from some of the reports from collaborators.

Connecticut: More than usual, about same as last year. Attacks all varieties; winter stage carried over in soil by lambs' quarters. Glut in market made loss from this disease less serious than it otherwise would have been. (Clinton)

New York: Fairly common on older spinach; statewide. (Chupp)

Virginia: Downy mildew was extremely severe in the entire Norfolk region during late November. This disease, according to Mr. Zimmerley, who has had a most excellent opportunity to observe it year by year, is at present more severe than at any time in the past 9 years. We have had a short spell of warm days, followed by cold rainy weather. Our observations agree that the disease has developed with remarkable rapidity during the short rainy spell. We are getting a number of trouble calls now from growers. We have never considered spraying spinach after it reaches a certain size as feasible, but may be forced to try some control work this year. It has been our custom to pay little attention to spinach mildew, reckoning it as a minor trouble. (McWhorter, Nov. 20)

South Carolina: The only disease of importance down here at present is the mildew of spinach. This trouble made its appearance the latter part of November and was present in all fields by December 15. Infections as high as 100 per cent were noted the last week of December. The cutting season is now on and the total losses will not run higher than from 3 to 5 per cent. (Moore, Jan. 25, 1926).

Louisiana: This disease was found for probably the first time in the state, in Iberville and East Baton Rouge Parishes. It evidently caused some damage in several places over the state. (Edgerton & Tims, Feb. 26)

Michigan: Reported from Harbor Springs as common and destructive in July. (Nelson)

OTHER DISEASES

Anthracnose caused by *Colletotrichum spinaciae* Ell. & Halst. was reported from Texas.

Wilt caused by *Fusarium* sp. Texas, important in restricted localities. (Taubenhaus)

Leafspot caused by *Heterosporium variabile* Cke. was reported by McWhorter from Virginia.

Rust caused by *Puccinia sarcobati* (Pk.) Bethel, Washington.

Rootrot caused by *Pythium debaryanum* Hesse. Connecticut "On base of old plants and therefore unusual as it commonly causes damping-off of young seedlings." (Clinton)

"Blight, cause unknown (*Fusarium* sp.?, beet curly top?) was worse than usual and worse than last year in California, in the San Francisco Bay and Sacramento River districts. It destroyed some late spring plantings and the early fall crop and also reduced the yield of the seed crop. The loss is estimated at 10 per cent. It causes yellowing and collapse of the leaves and decay of the tap root." (Rosa)

Chlorosis (non-par.). McLean, Forman T., and Basil E. Gilbert. Manganese as a cure for a chlorosis of spinach. Science n. s. 61: 636-637. 1925. Dilute solution of manganous sulfate applied as a spray.

"Wilt (undet., bacterial ?), seriously affected the seed crop in making blight resistant seed. This disease is now being investigated at the Virginia Truck Experiment Station." (McWhorter)

SPINACH (NEW ZEALAND)

Mosaic (undet.). "Typical symptoms observed on plants in greenhouse, Newark, Delaware." (Adams).

SWISS CHARD

Leafspot caused by *Cercospora beticola* Sacc. was reported from Texas and Porto Rico.

YAM

Leafspot caused by *Cercospora carbonacea* Miles was reported from Porto Rico.

THE PLANT DISEASE REPORTER

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Supplement 46

A Preliminary Report of Surveys for Plant Diseases In East China

June 1, 1926

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

A PRELIMINARY REPORT OF SURVEYS FOR PLANT DISEASES IN EAST CHINA

By R. H. Porter, Plant Pathologist of the Department of Botany, College of Agriculture and Forestry, University of Nanking, China; and Collaborator with the Plant Disease Survey.

Plant Disease Reporter
Supplement 46

June 1, 1926.

CONTENTS

Foreword

As one of the series of supplements to the Plant Disease Reporter we are glad to publish this preliminary report on plant diseases in East China by R. H. Porter. Mr. Porter, who was formerly connected with the College of Agriculture at Ames, Iowa, assumed his duties as plant pathologist with the College of Agriculture and Forestry at the University of Nanking, September 1, 1923. He has, therefore, had the opportunity to observe crops and their diseases over two entire seasons and during the fall of 1923.

The majority of diseases herewith reported are common in this country but, as Mr. Porter points out, there are numerous others, some of which are very important, that do not occur here, and mention of which is reserved for future reports.

Specimens of all the diseases mentioned in the report, with the exception of the mosaic diseases, cyrtosis of cotton, *Sclerotinia* sp. on apricot, the soft rots of cabbage and tomato, rootrot of pea, and potato diseases, have been received in the Bureau of Plant Industry and deposited in the mycological herbarium.

R. J. H.

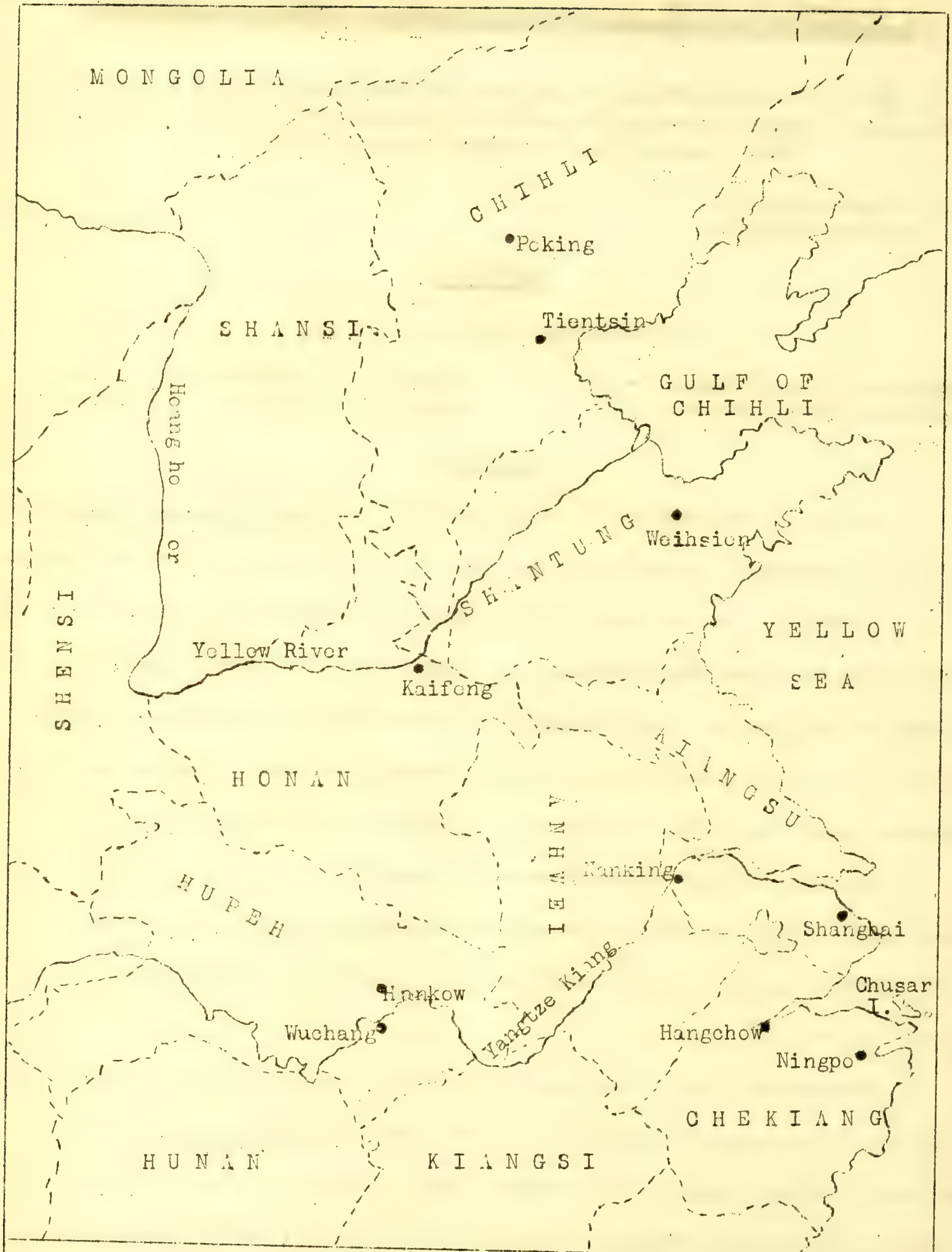

Fig. 3. Map of eastern China showing provinces and localities mentioned in this report.

INTRODUCTORY STATEMENT

During the past two years the Division of Plant Pathology of the University of Nanking has been making surveys in certain localities of East China for those diseases which are common on economic crops. These surveys are by no means complete, but the preliminary results are presented now for the purpose of giving an indication of some of the factors which are responsible for certain low yields. Not all of the diseases which have been observed on these crops are included in this report because the causal agents of some of them have not been determined.

DISEASES OF CEREAL CROPS

BARLEY

Both smuts of barley are very widespread. They have been observed wherever barley is grown. Furthermore it should be noted that a large percentage of the barley in East China is of the hulless type, which may account in part for certain high percentages observed. For example, in one field near Nanking there was a total of 23 per cent of smut, including both loose and covered. Other fields contained from 10 to 15 per cent.

Barley stripe is more or less prevalent; certain fields have been observed to contain approximately 10 per cent, but the average of course is not this high.

Estimated percentage losses from barley diseases:

Loose smut, *Ustilago nuda* (Jens.) Kell. & Sw.	3.6
Covered smut, *U. hordei* (Pers.) Kell. & Sw.	4.3
Black stem rust, *Puccinia graminis* Pers.	Trace
Dwarf leaf rust, *P. anomala* Rostr. (P. simplex)	Trace
Powdery mildew, *Erysiphe graminis* DC.	2.0
Stripe, *Helminthosporium gramineum* Rabh.	3.0
Net blotch, *Pyrenophora teres* (Died.) Drechs.	1.0

CORN

The Physoderma disease of corn was not observed around Nanking in 1924, but during the wet season of 1925 it was quite common in the region of Nanking. It was also observed as far north as Weihsien, Shantung, which is in the northern part of the province. The leaf spot of corn caused by a species of Helminthosporium is common in every corn field around Nanking.

Estimated percentage losses from corn diseases:

Leaf spot, *Helminthosporium* sp. - - - - - - - - - - - -	7
Smut, *Ustilago zeae* (Beckm.) Ung. - - - - - - - - - - -	4
Brown spot, *Physoderma zeae-maydis* Shaw - - - - - - -	3

KAOLIANG (GRAIN SORGHUM)

Both the kernel and head smuts of kaoliang are more or less common. In addition there are three leaf spot diseases which vary in severity in different localities. Anthracnose seems to be widely distributed, and in northern Anhwei Province was observed to cause severe loss. In Honan Province around Kaifeng Cercospora leaf spot was by far the most important, It was very difficult to find a plant in any of the fields which was entirely free from this disease.

Estimated percentage losses from kaoliang diseases:

Leaf spot, *Cercospora* sp. - - - - - - - - - - - - - - -	5
Loose kernel smut, *Sphacelotheca cruenta* (Kühn) Potter -	4
Anthracnose, *Colletotrichum lineola* Cda. - - - - -	4
Leaf stripe, *Septoria pertusa* Heald & Wolf - - - -	4
Head smut, *Sorosporium reilianum* (Kühn) McAlp. - -	3

MILLET

In individual cases the smut of millet has been observed to run as high as 50 per cent. This was especially true in Weihsien, Shantung. The

average, of course, is much lower. Downy mildew of millet seems to be quite widespread over North China. Personal observations were made in northern Anhwei, Shantung, and Honan Provinces. Samples have also been received from the region around Peking and from southern Shansi. This would indicate that downy mildew is one of the most common and destructive diseases of millet. Rust also is very widespread on millet, causing considerable loss. The leaf spot caused by a species of Helminthosporium is less common, yet may be found in nearly every field.

Estimated percentage losses:

Smut, *Ustilago crameri* Korn.	8
Downy mildew, *Sclerospora graminicola* (Sacc.) Schroet.	6
Rust, *Uromyces leptodermus* Sydow (*U. setariae-italicae*)	5
Net blotch, *Helminthosporium* sp.	1

OATS

Wild oats are commonly infected with loose smut, *Ustilago avenae* (Pers.) Jens., but the cultivated oat is not grown in the region of Nanking. Dr. H. H. Love, who was in the northern part of China (Chihli Province) during the summer of 1925, reported that on oats in that region, especially on certain experimental plots, smut ran as high as 80 per cent. This was principally on a hulless variety.

WHEAT

Wheat is by far the most important winter crop throughout East China, and is attacked by a large number of diseases. In Chekiang Province, *Puccinia graminis* seems to appear early, causing considerable loss. This is also true in the region of Wuchang, Hupeh. Around Nanking the loss from this disease varies

with the season. The leaf rust and stripe rust, however, are more serious factors than the black stem rust. Powdery mildew, in the vicinity of Nanking, appears earlier than any of the rusts and on certain varieties completely covers the stems and leaves. On the whole it causes more loss than any of the rusts. Loose smut of wheat is quite widespread, but seldom reaches a high percentage. Flag smut seems to be almost as widespread as the loose smut and causes losses ranging from a trace to 20 per cent. Scab of wheat was a serious factor during 1925 only in the region of Ningpo, Chekiang Province. Nematode of wheat, however, is as widely distributed as either of the smuts and causes serious loss.

Estimated damages:

Leaf rust, *Puccinia triticina* Eriks. - Loss 4%.

Nanking: April 1925, developing as season advanced.
Hankow-Chekiang: April 27, abundant.
Ningpo and Chusan: May 15, very prevalent.

Black stem rust, *Puccinia graminis* Pers.

Nanking: Trace.
Ningpo: May 13, severe in certain places.
Wuchang, Hupeh: Severe.

Stripe rust, *Puccinia glumarum* (Schm.) Eriks. & Henn.

Nanking: Quite common and destructive under favorable conditions, appears later than *P. triticina*.
Samples have been received from Weihsien, Sung.

Powdery mildew, *Erysiphe graminis* DC.

Nanking: Destructive, especially on late maturing varieties. April 11, very prevalent - 4%.
Hangchow: On wheat 10%; quack grass 5%.
Chusan: 10%.

Loose smut, *Ustilago tritici* (Pers.) Rostr.

Nanking: 2 to 5%.
Hangchow: 2 to 8%.
Chusan: 2 to 4%.

Flag smut, Urocystis tritici Körn.

Nanking: Trace to 20%.
Nanhsuchow: 2 to 4%.
Kaifeng: 3%.
Weihsien: Trace.

Scab, Gibberella saubinetii (Mont.) Sacc.

Ningpo: 1 to 4%. (Bearded wheats had a higher percentage than native.
Nanking: Trace.

Nematode, Tylenchus tritici (Stein.) Bast.

Nanking: 1924 very destructive; 1925 common.
Nanhsuchow: Also common.

DISEASES OF FIELD CROPS

BROAD BEANS

These beans, known botanically as Vicia faba, constitute one of the most important winter crops in the Lower Yangtze Valley. Besides mosaic, they have a high percentage of rust each year. There are other diseases of the broad bean, which are under investigation and which cause even more loss than rust and mosaic combined.

Estimated percentage losses:

Rust, Uromyces fabae (Pers.) D By.	5
Mosaic, cause unknown	2

COTTON

Anthracnose is very common on American varieties of cotton, but the Chinese varieties seem to be less susceptible. The past season it was particularly severe, reducing the yield of American cotton from 5 to 15 per cent. Cyrtosis also is more severe on American cotton than on Chinese. In Honan

Province the leaf spot caused by a species of Phyllosticta was observed but the species is questionable for the simple reason that we are lacking in host indices for the determination of fungi.

Estimated percentage losses:

Anthracnose, *Glomerella gossypii* (South.) Edg. - -	5
Cyrtosis, caused by leaf hoppers - - - - - - - - - -	6
Leaf spot, *Phyllosticta* sp. - - - - - - - - - - - -	2

COWPEA

The loss in yield of cowpea is very similar to that listed for field beans.

Estimated percentage losses:

Rusts, *Uromyces vignae* A. Barclay and *Uromyces appendiculatus* (Pers.) Link - - - - - - - - -	6
Mosaic, cause unknown - - - - - - - - - - - - - - -	5

FIELD BEAN

Field beans include a large variety of Chinese beans. One of the principal ones is the green bean. On all of these beans rust is a serious factor, reducing the yield from 2 to 10 per cent. Leaf spot is also of considerable importance, the green bean being especially susceptible.

Estimated percentage losses:

Rust, *Uromyces appendiculatus* (Pers.) Link - - - -	6
Leaf spot, *Cercospora* sp. - - - - - - - - - - - - -	4
Mosaic, cause unknown - - - - - - - - - - - - - - -	3

FLAX

No fields of flax have been observed because it is grown principally in North China. However, a sample was received from this region which was

severely infected with rust, *Melampsora lini* DC., indicating that this disease is a limiting factor in flax production.

RAPE

Rape is very common throughout the Yangtze Valley region, being used principally for oil, which is pressed from the seed. In the spring, downy mildew is very common, especially if the weather is damp and cool, as the crop approaches maturity. The leaf spot caused by *Alternaria brassicae* is present in nearly every field.

Estimated percentage losses:

Downy mildew, *Peronospora parasitica* (Pers.) D By. - 2 - 5
Leaf spot, *Alternaria brassicae* (Berk.) Sacc. - - - 1 - 3

SOYBEAN

The most common disease of soybean in China is mosaic, the loss from which is difficult to estimate but it is thought to be about 6 per cent. It seems to be much more common than in the middle western United States, where the writer has made observations.

SUNFLOWER

This crop is grown quite widely by the Chinese, and the seed is used for various purposes. Rust, *Puccinia helianthi-mollis* (Schw.) Jack., is very common, but seems to come on so late that little damage is caused. The same is true of powdery mildew, *Erysiphe cichoracearum* DC.

DISEASES OF VEGETABLES

BEAN

Practically all varieties of beans are attacked by rust. Leafspot is also quite common and mosaic is very generally distributed.

Estimated percentage losses:

Rust, *Uromyces appendiculatus* (Pers.) Link - - - -	5
Leaf spot, *Cercospora* sp. - - - - - - - - - - - - - -	4
Mosaic, Cause unknown - - - - - - - - - - - - - - - -	3

BEET

Leafspot of beets, *Cercospora beticola* Sacc., is widespread, in many cases the entire leaf surface being covered with the spot. In individual cases it is estimated that the loss caused by this disease is 15 per cent, but for East China 5 per cent probably represented the average.

CABBAGE

Early blight is very common, and there is a soft rot, the cause of which has not been determined definitely, which is quite destructive during wet weather.

Estimated percentage losses:

Early blight, *Alternaria brassicae* (Berk.) Sacc. - -	2
Soft rot, Bacteria -	4

CUCUMBER

During the past year there was only a slight trace of downy mildew. In the fall of 1923 this disease was very destructive not only on cucumbers but

also on squash. A very noticeable thing about Chinese long cucumber is its freedom from mosaic, only a few plants having been observed with this disease.

Estimated percentage losses:

Downy mildew, _Pseudoperonospora cubensis_ (Berk. & Curt.) Rostew.	5
Mosaic, Cause unknown	Trace

PEA

Rootrot, cause not determined, caused a loss estimated at 6 per cent.

PEANUT

Wherever peanuts are grown the leafspot, _Septogloeum arachidis_ Rac., is very common. In the region of Kaifeng, Honan, where a number of foreign varieties have been introduced, it is quite destructive.

POTATO

Although potatoes are not widely grown in China there are certain region where this crop is of some importance. Scab and early blight are of common occurrence. Mosaic seems to be widespread in regions having climate similar to that of Nanking, where the spring and summer are usually humid and hot.

Estimated percentage losses:

Scab, _Actinomyces scabies_ (Thax.) Güssow	5
Stem end rot, _Fusarium_ sp.	4
Early blight, _Alternaria solani_ (Ell. & Mart.) Jones & Grout	2
Mosaic, Cause unknown	3

SPINACH

Downy mildew, _Peronospora effusa_ (Grev.) Ces. caused a trace of loss.

SQUASH

Mosaic, cause unknown, is very common but the loss apparently is slight.

TOMATO

Samples of tomato plants have been received from West China, which were infected with Fusarium wilt. Observations were made in North China in the provinces of Shantung and Honan, where this disease was destroying 75 per cent of the plants. Mosaic in the region of Nanking is perhaps the most severe disease that we have to contend with. In our gardens last summer the early planted vines suffered 80 per cent damage. There was also a soft rot of fruit which appears during the season and from which specimens of fungi and bacteria have been isolated, but no infection experiments have been carried on.

DISEASES OF FRUITS

APRICOT

Brown rot, Sclerotinia sp., is common on apricots, but to much less extent than on peaches. Estimated loss 3 per cent.

GRAPE

Ripe rot is destructive in the vicinity of Nanking and samples have been received from other regions. The fruit spot resembles very closely the anthracnose disease as described in America. (Note: The specimens submitted showed the anthracnose fungus Sphaceloma ampelinum D By. (Gloeosporium ampelophagum (Pass.) Sacc.)

Estimated percentage losses:

Ripe rot, Gloeosporium sp. ? - - - - - - - - - - - - 7
Anthracnose, Spaceloma ampelinum D By. - - - - - - 5

MULBERRY

This crop is very important in the silk industry. Powdery mildew, Phyllactinia corylea (Pers.) Karst., appears in the late summer and fall and completely covers the leaves. It is questionable, however, how much loss this disease causes.

PEACH

On the peach, brown rot is by far the most destructive disease. Leaf curl is also common, especially around lake regions. There is a leaf spot (shot hole) which looks like the leaf spot in America, caused by Bacterium pruni. No isolations have been made. (Note: The specimens submitted with this report looked more like insect or spray injury than like shot hole caused by B. pruni.)

Estimated percentage losses:

Brown rot, Sclerotinia sp. - - - - - - - - - - - - - 11
Leaf curl, Taphrina sp. - - - - - - - - - - - - - - 3
Leaf spot, undetermined - - - - - - - - - - - - - - 3

PEAR

The most destructive disease of the pear in this region is rust. There are two species, one of which apparently goes to the red cedar, Juniperus chinensis. The second species is common in the region around Kaifeng, Honan. Around Nanking it has been observed that the rust comes on so early in the season

that it completely defoliates the young trees. Pear growing in this region, therefore, is very unsuccessful.

Estimated percentage losses:

Blight, probably *Bacillus amylovorus* (Burr.) Trev.	1 to 4
Rusts, *Gymnosporangium* spp.	15

STRAWBERRY

Leafspot, *Mycosphaerella fragariae* (Tul.) Lindau, is severe.

THE PLANT DISEASE REPORTER

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Supplement 47

Diseases of Fruit and Nut Crops

In the United States in 1925

June 15, 1926

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

DISEASES OF FRUIT AND NUT CROPS IN THE UNITED STATES IN 1925

Prepared by

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SECTION ON CITRUS AND SUB-TROPICAL FRUITS

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Plant Disease Reporter
Supplement 47

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INTRODUCTION

The reader of this summary will probably be impressed by the fact that the year 1925 was very unique in so far as it demonstrated, to an unusual extent, the correlation of weather factors and disease occurrence on the fruit crops of the United States. It is suggested at this point that the reader first glance over the abstracts of the monthly conditions of temperature and precipitation and the departures from normal given on pages 173 to 179 in order to get a better interpretation of the comparatively slight fungous losses on fruits reported for 1925. It is a well-known fact that weather is probably the most important factor in the occurrence, development, and spread of plant diseases in any particular year. In view of the fact that the country-wide status of the weather in 1925 was in many respects the most extraordinary of the past 50 years, it will be interesting to note how this condition is reflected in the comparatively slight losses suffered from fungous diseases of fruits.

The predominance of data on apple diseases which is again apparent as in previous years is due, very likely, to the widespread distribution of the host, but is out of proportion to the economic importance of this fruit compared with the other fruits such as citrus, grapes, peaches, strawberries, etc.

It was considered to be a worth-while departure from the procedure in previous summaries on fruit diseases to include at the very beginning of the 1925 summary a brief digest presenting what appears to the writer to be some of the noteworthy and interesting contributions for the year. This digest will enable the reader to select those contributions and give them his detailed attention if he desires.

DIGEST OF NOTEWORTHY OBSERVATIONS CONTAINED IN THIS SUMMARY

The unusually small damage caused by fungous diseases in 1925 was probably the main factor in the production of a larger commercial apple crop than in 1924, in spite of the fact that the total apple production in the United States was approximately seven-and-a-half million bushels less than in 1924. Country-wide weather conditions in 1925 were most unfavorable for the development and spread of fungous diseases of fruits.

Ascospore ejection studies of Venturia inaequalis were given particular emphasis in 1925. Data from Wisconsin, Minnesota, New York, Pennsylvania, New Jersey, West Virginia, Virginia, and Tennessee indicate a rather close correlation between dates of heaviest ascospore ejection and subsequent infection by this fungus. In the Northern States the heaviest spore ejections occurred previous to and during the prepink and pink stage of the blossoms. In the Southern and East Central States the period of maximum ejection occurred somewhat later, just before and during pink and calyx closing periods. The result of this was to make the delayed dormant and prepink sprays relatively more important in the North than farther South. Unusually late scab infection caused most of the losses from this disease in New York and Minnesota in 1925.

Blotch control experiments with various fungicides gave striking results in New Jersey, Ohio, Illinois, Tennessee, and Virginia. The relative control value of each blotch spray has been correlated with blotch spore exudation from cankered twigs in Virginia. The etiology and control of blotch have been treated in a very comprehensive manner by Guba (Illinois Sta. Bul. 256).

Studies of cedar rust spore discharges and the correlation of percentage and intensity of rust infection on York Imperial apple leaves with distance from uncut cedar tree areas were made in Virginia. Notable results in cedar rust control due to the cutting out of the intermediate host, the red cedar, were also reported from that state.

Injury of fruit by blackrot was directly correlated with codling moth injury in Virginia and Indiana. In Missouri blackrot followed hail injury, while in Minnesota it was reported following fireblight.

A new apple rot which looks like blackrot but which is caused by Botryosphaeria instead of Physalospora has been described by Shear, Fenner, and others.

Apple bitter rot spore exudation studies in relation to rainfall were conducted at Winchester, Virginia. The first instance ever reported in the East of the overwintering of this fungus in twigs and fruit infection from this source was observed at Winchester. Twig infection had previously been reported in South Carolina.

Bacillus amylovorus, causing blight on apples, pears, and quinces is one of the few diseases reported to be of greater prevalence than normally in the United States in 1925. It was reported on cherry from Michigan and Kansas. An outstanding contribution treating of the behavior of Bacillus amylovorus was made by Nixon. Migration of the organism in the form of zoogloea through intercellular spaces and the formation of cysts within the central vacuoles and hibernation in this form were determined in this study.

Notable results in research on crowngall were recorded in 1925. Toxic relations between black walnuts and apples were reported by Schneiderhan of Virginia

Losses due to frost injury on apples, pears, peaches, cherries, and plums were very extensive in most of the North Central and East Central States in 1925. Frost injury was the limiting factor in many states. The largest hail insurance adjustment ($53,000) ever paid for injury in one apple orchard in the United States was reported from Mt. Jackson, Virginia.

A new apple canker and fruit rot (Gloeosporium perennans) in Washington and Oregon was described by Zeller and Childs. A new storage disease resembling soft scald of apples was reported from Oregon.

Sulfur dust applied to peaches two or three weeks before picking in rainy weather considerably reduced brownrot in transit. The practicability of peach dusting in Georgia and cranberry dusting in New Jersey by using airplanes is also mentioned.

Five years of investigation by H. W. Anderson on the overwintering habits of Bacterium pruni under Illinois conditions have shown that the common source of initial infection is not the cankered twigs alone but also infected leaves. Anderson's work on the control of bacterial spot (Bacterium pruni) with sodium silico-fluoride also is notable. The preliminary results indicate the possibility of using this material as a fungicide to control the disease. The reports on the non-occurrence of peach yellows in Illinois and Indiana and on the local outbreak of it in Michigan are noteworthy. The role of Aphis rubiphila in the transmission of raspberry leafcurl has been determined by Smith. The possibility of false blossom of cultivated cranberries being caused by an infectious agent is indicated by the investigations carried on by Stevens this year. Spraying experiments in pecan scab control carried on by Demaree indicate that bordeaux mixture is the most effective fungicide, while Neal, of Mississippi, reports distinct advantages in using bordeau oil emulsion.

SOME SUGGESTIONS TO COLLABORATORS

Better Cooperation on the Part of Collaborators Needed

The writer being a collaborator may be pardoned for offering some suggestions to his colleagues on this subject. There is great diversity in the quality and quantity of the data supplied. Not all the collaborators are contributing satisfactory data regarding the major crops in their state, even in cases in which certain diseases are among the limiting factors in the production of these crops. The compilers of the annual disease summaries have been greatly impressed by the small amount of information available regarding certain crops and from different states. An examination of the annual fruit and nut disease summaries of the past three years shows that every compiler has made constructive suggestions for the improvement of the annual survey, and there has been some improvement, particularly in the data submitted from the Far West and from certain states west of the Mississippi. It is, however plainly apparent to any one who makes a critical inspection of the data included in the present summary that there is room for much additional improvement and that the annual compilations for the various crops cannot be of maximum usefulness unless more complete and accurate information is supplied.

In reviewing the attitude of former compilers the following quotations were taken from the last three annual fruit disease summaries:

Adams, J. F. Supplement 28: 268. 1922. "In summarizing the data by collaborators in 1922 certain conditions have been stated and suggestions made which are pertinent to disease problems in general. Greater cooperation along certain lines indicated in the summary would assist materially in explaining and coordinating disease conditions and contribute to the working out of more efficient control measures. The Plant Disease Survey affords a 'clearing house' for brief reports on the results of investigations that might seriously be delayed through other means of publication."

Orton, C. R. Supplement 33: 36. 1923. "Practically all of the reports in 1923 came from the eastern half of the United States, while only a few scattered reports came from the rest of the country. From the great fruit-producing state of California a very meager amount of information was available. The Plant Disease Survey can never hope to carry out its purpose in a fully creditable way until full cooperation from collaborators in each state is secured."

Giddings, N. J. Supplement 39: 2. 1924. "During the next few years there is going to be a tremendous increase in the use of the records of the Plant Disease Survey Office and every one of the collaborators who does his best to turn in accurate and valuable data will be amply repaid in more ways than one. Of course it is understood the plant-disease problems are of more importance in some states than others and that the facilities and funds are inadequate for much plant-disease survey work in most of the states. That phase of the problem is one which we must keep in mind, but in the meantime we can all do our best with the facilities that are available."

It is obvious that the plant-disease summaries cannot include all the details of pathological research and disease conditions in every state every year, but the most outstanding events can and ought to be set forth clearly in a publication of this kind so that a plant pathologist in any state or in foreign parts can by reading the summary ascertain such facts as are most important in the disease status of any particular state.

There is little doubt that the annual summaries of diseases of fruits, cereals, vegetables, and ornamentals are the most comprehensive effort in that direction made by any organization in the United States. If these summaries are not what they should be the fault lies with us. It indicates that we, the collaborators, are not properly informed of plant-disease conditions in our own states or else we lack the time or the inclination to furnish the disease data. In either case we show a lack of appreciation of the increasing value of these annual summaries and furthermore we are not availing ourselves of an opportunity to become better known as phytopathologists.

A New Annual Report Form

Examination of the survey cards filled out by collaborators during the past five years shows that less than 50 per cent of the data requested is actually entered. This is the fault of either the card or the collaborators. Upon the assumption that the former is the chief cause, considerable thought has been given to the preparation of a new report blank, and previous compilers of the summaries have been requested to contribute their ideas toward its formulation. The result is a new survey card, which it is hoped will be found considerably better than the one used hitherto. The varying terminology possible in former cards has been largely eliminated by a simple checking of definite terms printed on the new card. There are other features which will obviously make it easier for the collaborator to submit his data. The new form of survey card will be found following this discussion. It represents the effort of the Plant Disease Survey to get more definite data, to facilitate the making out of reports by the collaborators and to eliminate such features of the old cards as were deemed impracticable. As is noted on

Space to be used for printing (State)

Crop.................................. Disease.................................

Cause.. Year..........

Crop Importance (Check)	major................... minor................... occasional plantings..... not grown commercially...	Prevalence compared with last year (Check)	much more... more........ same........ less........ much less...	Prevalence compared with average year (Check)	much more.. more....... same....... less....... much less..	Importance of this disease in an average year (Check)	very....... moderate... slight.....

Loss for State (Use figures above 0.1%; mark trace below 0.1%)	% reduction in yield...... % loss in grade, storage, transit, etc... Total loss................ Maximun % infection in any one field..........	Geographic distribution in State this year General()Local()Scattered() (Check) Explain	Earliest recorded appearance of disease this year Date......................... (month) (day) Place........................ (town) (county)	Period of maximum injury Season (Check) Early... Mid..... Late.... Stage of host

Weather relations this year

Moisture (Check) — Favorable..... Unfavorable... to disease — Explain

Temperature (Check) — Favorable..... Unfavorable... to disease — Explain

Varietal susceptibility this year

Varieties immune :

" very resistant :

" resistant :

" susceptible :

" very susceptible:

General remarks: basis of loss estimate, new work, control measures, unusual observations, etc.

the forms, it is not expected that all the information for which space is provided will or can be supplied. Reports should be made only on matters regarding which reasonably definite and accurate information is available -- in other words quality is much more important than quantity.

Suggestions for Improving Collaborators' Reports

(1) More definite records in all states of dates of the first and maximum appearance of diseases, dates of spray applications, dates of maximum injury to crops, and more careful judgment in making estimates of losses by diseases and other injuries to crops.

(2) A careful examination of annual field, laboratory, and other Departmental reports for the purpose of selecting and submitting to the Plant Disease Survey the most important results obtained during the current year's work.

(3) Every collaborator should send in the disease card of every crop, regardless of whether the disease occurs or whether the crop is grown in that particular state or not. Notation on the card whether the crop or the disease occurs would be a great help in preparing the summaries at headquarters.

(4) Sending in of survey cards before the close of the year. This will greatly expedite the difficult task of compiling the data for the annual summaries.

THE WEATHER OF 1925

In many respects the weather conditions of 1925 were the most unique of the past 50 years. It was unusually hot and dry and the combination over most of the United States resulted in a smaller loss from fruit diseases than in 1924 or in the average year. There were, of course, local areas within states where dry, warm weather did not prevail. It is a difficult task to correlate weather with disease occurrence over so large a geographical area as the United States. Specific correlations are possible only in limited areas of individual states, therefore, any statement made in this supplement in regard to country-wide correlation of weather and fungous disease occurrence must necessarily be construed as a general average to which local exceptions will occur.

TEMPERATURE

It is unusual to have the month of April show above-normal temperatures in every state in the Union. The average temperature for the twelve months was above-normal in every state in 1925, which is another unique record. An examination of the data in table 35 shows that of the months from April to September inclusive, the important growing months in the largest part of the United States, only May was subnormal in temperature. Extreme temperature

variations occurred in June when 123° was recorded in California and below freezing temperatures in Montana and the Oregon mountain section. The only month which was considerably below normal in temperature was October, during which the temperatures in the central and northern states east of the Rocky Mountains were the lowest on record for that month during the past 50 years.

The following statements of the temperature conditions by months were abstracted from The Monthly Weather Review (Vol. 53. 1925).

<u>January</u>

This month was free from pronounced and widespread cold waves. The greater part of the month was marked by persistent regional contrasts of temperature conditions, some states or portions of states having lasting cold weather while others were experiencing very mild weather.

<u>February</u>

The outstanding feature of the month was the mild temperature experienced in practically all parts of the country. There was an absence of cold waves. The condition resulted probably from the great barometric depressions centering over the Gulf of Alaska.

<u>March</u>

March 1925, like February, was characterized by above-normal temperature in all parts of the United States except the extreme southern tip of Florida. It was the second month of above-normal temperatures in all parts of the country, a rare occurrence.

<u>April</u>

Like the months immediately preceding, April 1925 was comparatively warm in practically all parts of the country, especially east of the Mississippi and south of the Ohio. Thus, the temperature was above-normal for the three consecutive months.

<u>May</u>

In the eastern districts an outburst of summer temperatures was experienced on the 23d and 24th. This was suddenly brought to a close by a wave of cool weather that swept southward on the 25-26th. On the whole, the month was was warm in the West and cool in the East, the Rocky Mountains being the dividing line.

<u>June</u>

An unusual June hot spell persisted in central and eastern districts during the first ten days of the month. The average temperature for the month was above-normal, a characteristic of 1925 thus far, except during May. The maximum temperature observed was 123° in California while below freezing temperatures were recorded in the northern mountains.

July

The first two weeks of July were hot over the greater part of the country. During the third week, the temperatures continued high from the Rockies westward. The last decade of the month was gratifyingly cooler. In the Carolinas, Georgia, and certain Northern Plateau regions the monthly means of temperature were among the highest on record.

August

This month like its immediate predecessor was warm and dry. The coolest periods were during the first part of the month in portions of the central valleys, but mainly during the last decade over the remaining portions of the country. Readings below freezing were reported in all northern border states. In the mountains of Oregon a temperature of 14° was reached.

September

The single outstanding feature of this month was the sharply contrasted distribution of temperature in various sections of the country. September 1925 set a record for heat unsurpassed in the authentic history of the section east of the Mississippi and south of the Ohio drainage systems and will probably stand unsurpassed for as long a time in the future. The weather was moderately cool in districts west of the Rockies and below freezing temperatures were recorded in the northern tier of states.

October

This month is the first in 1925 having a temperature considerably below normal. No previous October in the past 50 years or more has had such low temperatures over nearly all central and northern districts from the Rocky Mountains eastward.

November

Important temperature changes were rapid and frequent but the monthly averages were mainly not far from normal. Average temperatures were above-normal on the Pacific Coast, along the entire northern border, and over New England. A moderately cool area covered the southeastern states and other districts east of the Mississippi except along the northern border, New England, and Florida. The lowest temperature reported was 21° below zero in the mountains of Colorado.

December

West of the Rocky Mountains the weather was moderately warm throughout the month, in fact, portions of the far Northwest had the highest December averages known. From the Great Plains eastward and generally over the southern states the temperatures were below normal except in portions of the North Atlantic States and extreme southern Florida.

In table 35 the data relative to the departures from normal of both temperature and precipitation for all states during April to September inclusive are given.

PRECIPITATION

The year 1925 will probably be long remembered as one of the driest in the history of the United States Weather Bureau records. From January to October, the average precipitation throughout the country was far below normal. In the southern Appalachian section, the drought was of unprecedented severity and duration, causing the oldest springs to dry up and resulting in general inconvenience and hardship. Nothing comparable to it is on record for the entire history of that section. It has been observed that even in years of sub-normal rainfall throughout the country certain spring or summer months will show above-normal precipitation, but in 1925 every month from January to October was sub-normal.

The following discussion treats of rainfall conditions by months during 1925. This information was abstracted from The Monthly Weather Review (Vol. 53. 1925).

January

Viewed as a whole, the month was one of scanty precipitation, except in south central, southeastern, east central and far northwestern states. Severe floods followed a considerable excess of rain in southeastern states. In California and Arizona the water shortage was serious.

February

This month was remarkably dry, particularly in the southern sections. From central California northward, the precipitation was mainly above-normal. Serious drought conditions prevailed from central Texas and Oklahoma to the eastern coast. In the northern states the precipitation was less than usual during this month.

March

A marked deficiency in precipitation existed over much of the country except New England, New York, and Montana. In certain sections of the cotton belt the rainfall was the least in 50 years. The drought in southern California was broken. In New Mexico a severe drought had existed for over a year.

April

Precipitation as a rule was mostly below normal except in Arkansas, Oklahoma, western and northern Texas, where the drought was relieved during the last decade of the month. The drought is becoming increasingly serious in Colorado and New Mexico.

May

A shortage of precipitation was rather general in central and eastern districts and curiously enough there were generous rains in California, sufficiently heavy to injure crops locally. All states had sub-normal rainfall except Florida, New Mexico, California, and Oregon.

June

This monthwwas warm and dry except in the Missouri and upper Mississippi Valleys and New England where precipitation was greater than usual.

July

The monthly precipitation was far less than normal throughout the country except in New England and the east coast states as far south as Maryland. Nevada had the heaviest precipitation on record while the Carolinas and Georgia had the lightest in 50 years. The water shortage in the southern Appalachian states was acute.

August

This month, like its immediate predecessor, was very dry. In the Southeast, the Southwest and in some north central states the drought of July was intensified with the result that a most serious situation with regard to stock and even for domestic purposes obtained in many localities.

September

September added another to the long list of months in 1925 deficient in precipitation. The drought in the southeastern sections of the country remained unbroken. Favorable rains fell in Texas and northeastward to the Great Lakes section.

October

The plentiful precipitation over most districts was in sharp contrast o that of many of the months preceding and very generally relieved the severe rought in the Southeast. Precipitation was far in excess of the normal over he lower Mississippi Valley and Gulf States.

ovember

From the Rocky Mountains eastward the bulk of the precipitation occurred uring the first half of the month. Above-normal rainfall occurred in the outhern Plains Lake area eastward to the Atlantic. Below normal rainfall ccurred from the upper Lakes westward including the Missouri Valley, the lateau Section and the Pacific Coast States, except southern California. The ovember totals in parts of Florida, notably at Miami, were the largest on ecord for that month.

cember

For the country as a whole precipitation was deficient in nearly all the ates, and even where in excess, the margins above-normal were small except in orida and locally along the South Atlantic Coast where the excesses were inly due to heavy rains attending the tropical storm of the first and second. the far West, precipitation was everywhere less than usual in December, expt along the immediate cost districts of Washington and in a few other small eas.

Table 35. Departure from the normal temperature and rainfall by states - April to September.
(Figures taken from United States Department of Agriculture Monthly Weather Review 53: 1925).

State	Departure from normal											
	Temperature (°F)						Precipitation (inches)					
	April	May	June	July	August	September	April	May	June	July	August	September
New Eng.	+1.9	-2.4	+3.0	-1.0	+0.1	-0.1	-1.08	-0.93	+0.71	+0.83	-1.72	+0.35
N. Y.	+2.0	-4.1	+3.3	-2.0	+0.3	+0.6	-0.29	-0.81	+0.59	+0.89	-1.29	+1.49
N. J.	+2.1	-2.6	+5.1	-1.5	-0.9	+2.1	-1.22	-0.93	-0.64	+2.78	-2.71	-0.71
Pa.	+2.5	-4.9	+4.1	-1.8	-0.7	+3.9	-1.02	-0.30	-1.19	+1.55	-2.24	-0.59
Del.-Md.	+2.7	-3.9	+4.8	-0.5	-1.6	+4.2	-0.77	-1.70	-1.69	+0.68	-1.84	-1.53
Va.	+2.7	-4.6	+4.2	+0.7	-1.6	+5.3	-0.73	-1.78	-1.79	-1.53	-2.12	-1.58
N. C.	+3.5	-2.9	+3.1	+2.1	-0.3	+6.2	-1.34	-1.27	-0.99	-3.18	-2.63	-1.96
S. C.	+3.7	-2.7	+2.8	+1.7	+1.3	+7.3	-0.92	-1.46	-1.71	-2.70	-4.40	-2.14
Ga.	+4.1	-1.7	+2.5	+2.1	+1.1	+8.6	-1.84	-1.59	-1.75	-2.28	-3.73	-2.10
Fla.	+0.4	-1.6	+0.2	+0.3	+0.1	+3.6	-1.25	+1.69	-0.38	+0.18	+0.03	-4.30
Ala.	+4.8	-1.3	+2.9	+1.6	+1.1	+8.2	-2.94	-1.79	-2.06	-0.83	-3.17	-0.85
Miss.	+5.2	-1.0	+2.0	+1.6	+0.6	+7.5	-4.26	-1.43	-1.78	-0.51	-2.02	-0.24
La.	+3.9	-1.4	+1.5	+1.4	+0.4	+4.2	-3.72	-1.73	-0.68	-0.98	-1.98	+1.69
Texas	+5.4	+0.6	+3.3	+2.7	0.0	+2.0	-1.19	-1.01	-1.86	-0.69	-0.38	+1.53
Tenn.	+5.2	-3.1	+4.1	+1.8	+1.0	+8.9	-1.15	-2.20	-1.54	-1.21	-2.63	-0.52
Ky.	+5.3	-4.4	+3.1	-0.2	+0.8	+7.0	-0.86	-1.39	-0.19	-0.29	-2.24	+0.03
W. Va.	+3.4	-4.8	+3.1	-0.9	-0.9	+5.0	-0.80	-0.84	-0.51	+0.21	-2.14	-0.73
Ohio	+4.2	-5.2	+3.6	-1.7	+0.3	+4.6	-1.23	-1.11	-0.98	+0.89	-1.12	+0.90
Ind.	+5.6	-4.1	+3.2	-0.9	+0.3	+6.2	-1.21	-2.80	-0.03	+0.82	-0.76	+2.22
Ill.	+6.8	-3.4	+3.2	-0.1	+0.5	+6.2	-0.75	-2.85	+1.19	-0.48	-0.78	+1.46

State	Temperature (°F)						Precipitation (inches)					
	April	May	June	July	August	September	April	May	June	July	August	September
Mich.	+5.0	-2.9	+2.9	-1.4	+2.0	+2.4	-0.47	-2.26	-0.67	+0.33	-0.51	+0.67
Wis.	+5.6	-2.9	+1.3	-1.1	+1.7	+3.4	-0.41	-2.70	+2.12	+0.57	-1.04	+1.18
Minn.	+6.5	-1.7	-1.0	-1.9	+2.8	+2.9	+0.02	-1.74	+2.82	-0.43	-1.11	+1.38
Iowa	+7.6	-2.4	+1.1	+0.3	+0.7	+4.7	-0.79	-3.45	+2.11	-1.19	+0.03	+1.39
Mo.	+5.9	-3.4	+3.0	+0.5	+0.5	+5.6	+0.38	-2.56	+1.43	-1.34	-0.23	+2.73
Ark.	+6.2	-1.2	+5.5	+1.9	+0.9	+6.6	-2.16	-3.24	-2.00	+1.07	-2.02	+2.63
N. Dak.	+6.1	+1.0	-1.3	-0.8	+2.5	+1.7	+0.26	-1.11	+2.57	-1.27	-1.21	+1.10
S. Dak.	+7.6	+0.6	-0.7	-0.4	+3.3	+4.3	-0.44	-1.45	+2.22	-0.99	-1.01	-0.67
Nebr.	+6.2	-0.3	+1.6	+0.9	+0.2	+3.7	-0.06	-1.49	+0.66	-1.24	+0.65	-0.32
Kans.	+6.2	-0.2	+4.5	+0.8	+0.1	+3.3	+0.92	-1.63	+0.05	-0.20	+0.33	+1.30
Okla.	+6.6	+0.3	+6.2	+2.8	0.0	+2.6	+1.12	-2.24	-1.94	+1.13	-1.66	+3.25
Mont.	+4.5	+2.9	+0.4	+2.3	-0.2	-0.3	+0.81	-0.86	+0.23	-0.38	-0.27	+0.87
Wyo.	+4.4	+3.1	-1.0	+1.4	-0.9	+0.7	+0.14	-0.20	+0.87	-0.16	+0.32	+0.11
Colo.	+4.2	+3.7	+0.9	+1.1	-1.3	+0.7	-1.43	-0.40	+0.31	+0.48	+0.73	+0.41
N. Mex.	+4.2	+3.0	+1.1	+1.1	-1.8	-0.3	-0.95	+0.19	-0.45	+0.78	+0.51	+0.45
Ariz.	+2.2	+3.6	-1.5	+1.2	-1.4	-1.9	+0.18	-0.13	+0.83	-0.43	-0.18	+0.82
Utah	+2.2	+4.1	-2.6	+1.6	-1.6	-1.1	-0.04	-0.40	+1.38	+0.32	+0.62	+0.37
Nev.	+1.7	+4.0	-0.4	+1.6	-2.7	-2.9	+0.61	-0.08	+0.67	+0.56	+0.45	+0.34
Idaho	+2.7	+3.9	+0.3	+2.9	-1.4	-0.5	+0.31	-0.24	+0.38	+0.01	+0.38	+0.42
Wash.	+2.5	+3.0	+1.4	+2.7	-0.5	+0.6	-0.13	-0.17	-0.50	-0.52	-0.16	-0.62
Oregon	+2.6	+3.2	+1.3	+2.9	-1.2	-0.2	+0.55	+0.32	-0.27	-0.34	+0.18	+0.23
Calif.	+0.2	+1.8	+1.0	+1.4	-1.4	-3.1	+1.16	+0.67	+0.27	+0.08	+0.13	+0.01

FRUIT DISEASES OF 1925

DISEASES OF POME FRUITS

APPLE

The total apple production in the United States in 1925 was 164,616,000 bushels compared to 171,250,000 bushels in 1924. However, the commercial production in 1925 was greater, amounting to 31,909,000 barrels compared with 28,063,000 barrels in 1924. The total estimated value of the apple crop in 1925 is $207,820,000.00 while that of 1924 was $202,326,000.00. In the order of production the states ranked as follows: Washington, New York, Idaho, Michigan, and Virginia. The state of Washington produced by far the largest crop of any of the states.

SCAB CAUSED BY VENTURIA INAEQUALIS (CKE.) ADERH.

Geographic distribution

Comparatively speaking, scab was of minor importance in the United States in 1925. As usual, it was co-existent with apple culture. Of the states reporting, one, Tennessee, reported more scab than normal, while New York, Oregon, California, and Tennessee reported more than in 1924. From the information at hand it appears that scab was more prevalent on the Pacific Coast and in New England than in other sections of the country.

Relative prevalence

It is evident that the best criterion for estimating a scab epiphytotic in any particular year is to compare its prevalence with other years. The Plant Disease Survey has data on relative prevalence of scab for the eight-year period 1918-1925, inclusive. The year 1925 represents one of the low water marks for scab during the past eight years. Table 36 shows the relative prevalence of scab in 1925 compared with 1924 and with the average year. Of the states reporting, fourteen reported less scab than normal, four reported normal, and one more than normal. Comparing scab prevalence in 1925 with 1924, only five states, New York, New Hampshire, Oregon, Tennessee, and Washington reported more scab, while fifteen states reported less, and five others reported the same as the year previous.

J. F. Adams of Delaware reports, "Prevalence much less than last two years. High temperatures and small rainfall have held disease in check.

In Virginia, according to Fromme, "The crop for the state as a whole is quite free from scab and there will be comparatively slight loss." From the same state Schneiderhan reports, "Studies of scab infection cycles in 1924 and 1925 indicate a striking contrast. In 1924 there were four distinct cycles of infection, while in 1925 there was only one primary cycle with practically no secondary infection."

From Ohio, Young reports, "Apple scab is of minor importance this year where any type of spraying or dusting was done."

In Minnesota, according to the Section of Plant Pathology, "During the rainy period early in September, considerable leaf infection developed in most of the apple regions. Up to this time there had been very little scab especially on the fruit which was almost entirely free."

From Washington, which produced the largest apple crop in the country this year, the Department of Plant Pathology reports, "Apple scab has been very scarce in eastern Washington and much less common and severe than usual in the western part of the state."

In Oregon, one of the few states reporting more scab than 1924, according to Barss, "Long continued cool, wet spring weather has resulted in an unusual incidence of scab in susceptible varieties and in unsprayed and improperly protected orchards in western Oregon." In contrast to this statement we have that of Childs reporting from Hood River, Oregon, "Scab is not generally prevalent in the Hood River Valley, but in the upper Valley near Parkdale some orchards showed from 15 to 20 per cent fruit infection this year."

In California, another state reporting more scab than last year, Milbrath says, "A large amount of late infection. Hardly an orchard in state without some scab."

From Manitoba, Canada, Bisby reports, "More scab than usual."

Table 36. Relative prevalence of apple scab in 1925 compared with 1924 and average year.

State	Prevalence compared with		State	Prevalence compared with	
	1924	Average year		1924	Average year
New Hampshire	more	less	Indiana	less	less
Connecticut	same	same	Illinois	less	less
New York	more	----	Michigan	less	less
New Jersey	less	----	Wisconsin	less	less
Delaware	less	----	Minnesota	less	less
Maryland	less	----	Iowa	less	less
Virginia	less	less	South Dakota	same	same
West Virginia	less	less	Kansas	same	less
Tennessee	more	more	New Mexico	same	----
North Carolina	less	less	Idaho	----	less
Alabama	same	same	Washington	----	less
Oklahoma	less	less	Oregon	more	----
Arkansas	less	less	California	more	----
Ohio	less	----			

Losses

Naturally the losses resulting from scab in the United States were considerably less than last year. In spite of the fact that a few states report greater prevalence, the actual reported loss in yield is less. New York, which reported greater prevalence this year than in 1924, had a loss of only 10 per cent compared to 20 per cent in 1924. In the United States as a whole, the total apple crop was smaller than in 1924 by approximately

seven-and-a-half million bushels, while the commercial crop was approximately three-and-a-half million barrels larger. This is a significant fact, which may be explained partly at least, by a lighter toll taken by fungous diseases.

The data in table 37 indicates the losses from apple scab in all states reporting during the past eight years. The last line of this table, giving the losses for the United States, is probably the most significant and indicates a yearly alternation of high and low scab losses. During the period recorded, there have not been two successive years of high losses. The weather, particularly rainfall, from the prepink until the 5-week spray is probably the most important single factor in the determination of scab prevalence in any particular year, unless a typical late infection occurs, as reported in Minnesota and New York this year. However, late infections are rarely as severe and injurious as the early type.

A digest of all the reports on scab for 1925 would seem to indicate that losses were minor in properly sprayed orchards. The disease was easily controllable because of weather conditions adverse to the fungus. The heaviest losses this year were due to late infection.

Weather in relation to scab in 1925

Weather conditions, as previously remarked, were unfavorable to scab development in 1925. In the Eastern United States the reports are very similar and mostly to the effect that conditions for initial infection were slightly unfavorable but that drought following the blooming period effectively reduced primary and secondary infection. In Massachusetts the spring was dry, while July was wet. Delaware reports subnormal rainfall and above-normal temperature. Similar conditions prevailed in Virginia, North Carolina, Georgia, and all of the lower Appalachian Highland section. In Arkansas the weather was very dry. In the states of Ohio, Indiana, Illinois, Michigan, Minnesota, Iowa, Kansas, and South Dakota the early growing season, particularly April and May, was very dry and warm thus preventing to a large extent the normal initial infection.

In contrast to the above mentioned conditions, we have the long-continued, cool, wet, spring weather in Oregon. In New York, according to D. D. Ward, in the New York College of Agriculture Weekly News Letter, June 22, (Onandaga County) - "Some apple scab injury on foliage is showing as a result of the rainy period just at the close of blossoming. Very little of the Calyx application was applied prior to the rain."

Anderson (Illinois) reports on July 1, as follows, "May 15 was the date when scab was first observed at Urbana. Practically no scab in southern end of state on account of extremely dry spring. Lightest infection ever known."

Bennett (Michigan) under date of September 1 says, "The dry weather has almost completely held scab in check. There is very little fruit infection on unsprayed trees. Considerable late infection is now showing up."

According to Vaughan (Wisconsin), "Early infection much less than usual This is associated with the extended drought of May. Extremely contrasting conditions prevailed in 1924 and 1925."

Schneiderhan reporting from Virginia says, "The total rainfall for April, May, and June, 1925, was 7.59 inches. Last year it was 18.16 inches. Approximately 70 per cent of the total annual ascospore discharge in 1925 occurred in April, too early for normal infection. A light initial scab infection resulted in practically no secondary infection because of the extremely dry weather in May, June, and July. The year 1925 was most unfavorable for fungous development."

Table 37. The percentage of reduction in yield due to apple scab in the United States for the period 1918 to 1925 inclusive.

State	Percentage reduction in yield due to apple scab								
	1918	1919	1920	1921	1922	1923	1924	1925	Average
Me.	-	+	8.	-	-	-	-	5.	6.5
N. H.	t	5.	10.	-	15.	1.	1.	2.	4.8
Vt.	-	5.	7.	2.	6.	5.	3.	2.	4.2
Mass.	t	1.	7.	-	5.	1.	5.	-	3.1
R. I.	-	2.	3.	-	-	2.	-	-	2.3
Conn.	0.5	2.	3.	12.	5.	3.	3.	2.5	3.6
N. Y.	5.	10.	5.	5.	22.	5.	20.	10.	10.2
N. J.	2.	-	5.	3.	-	0.5	12.	4.	3.6
Pa.	6.	10.	6.	15.	30.	4.	15.	-	12.3
Del.	-	5.	5.	2.	2.	3.	10.	5.	4.6
Md.	t	4.	3.5	4.	4.	3.	3.5	2.	3.
Va.	2	4.	4.	4.	15.	3.	18.	4.	6.7
W. Va.	t	3.	8.	5.	6.	1.	6.	2.	3.8
N. C.	-	4.	10.	-	-	8.	7.	3.	6.4
S. C.	1.	1.	5.	-	t	1.	1.	t	1.2
Ga.	1.	1.5	5.	5.	6.	3.	6.	1.	3.5
Fla.	-	-	-	-	-	-	-	-	-
Ohio	-	4.	5.	8.	8.	6.	10.	0.5	5.9
Ind.	-	3.	3.	3.	5.	4.	4.	1.	3.4
Ill.	4.	6.	8.	12.	7.	3.5	2.5	0.5	5.4
Mich.	5.	8.	8.	2.	16.	1.	12.	2.	6.8
Wis.	5.	8.	7.	5.	5.	2.	15.	5.	6.5
Minn.	.5	5.	8.	1.	5.	3.	3.	t	3.2
Iowa	3.	4.	4.	10.	10.	7.	10.	2.5	6.3
Mo.	2.	3.	5.	5.	-	-	-	-	3.7
N. D.	-	-	2.	-	2.	1.	1.	-	1.5
S. D.	-	8.	15.	-	2.	-	4.5	3.	6.5
Nebr.	-	8.	5.	-	-	-	5.	1.	4.7
Kans.	t	8.	7.	1.	5.	1.5	1.5	0.5	3.1
Ky.	5.	-	10.	-	3.5	30.	20.	10.	13.1
Tenn.	5.	10.	20.	t	12.	2.	1.	10.	7.5
Ala.	t	4.	3.	-	-	4.	2.	3.	2.6
Miss.	-	t	1.5	t	-	t	t	-	0.3
La.	-	t	-	-	-	-	-	-	+
Texas	-	-	0	0	-	-	0	0	-
Okla.	0	t	5.	1.	-	-	5.	-	2.7
Ark.	2.	0.5	2.	t	0.5	0.5	t	t	0.7
Mont.	t	t	2.	1.	-	-	t	-	0.6
Wyo.	-	-	-	-	-	-	-	-	-
Colo.	t	t	-	-	-	-	0	t	+
N. Mex.	-	0	-	-	-	-	2.	2.	2.
Ariz.	-	0	-	-	-	-	0	-	-
Utah	-	-	0	-	-	-	-	-	-
Nev.	-	-	0	-	-	-	-	-	-
Ida.	-	0.2	0.5	1.	t	0.5	t	t	0.3
Wash.	t	0.5	0.2	8.	0.3	0.5	t	t	1.2
Oreg.	2.	2.	15.	15.	5.	-	t	2.5	5.9
Calif.	-	-	0.5	-	-	-	-	4.	2.2
U. S.	2.5	3.93	6.	5.7	11.1	3.12	8.83	3.34	5.55

Data on ascospore emission

It has been generally recognized, particularly during the past six years as a result of special studies correlating ascospore emission with infection, that the time of first emission and the period of maximal emission of ascospores are probably two of the most important factors in the determination of an epiphytotic of scab in any particular year. Comparing such northern apple producing sections as Wisconsin, Michigan, and New York with the more southern ones of Delaware, Maryland, Virginia, and West Virginia we find a different correlation between initial ascospore emissions and vegetative advancement of the tree. It is apparent that ascospores begin to discharge in these northern states when the trees have advanced comparatively little from dormancy, while in the other states mentioned, first ascospore emissions usually occur just previous to and during the pink and blooming period. The result in the North is that the delayed dormant or prepink sprays are of relatively greater importance for scab control than in the states farther South.

Wisconsin: According to Keitt and Wilson (13) conditions affecting the abundance of ascospores of *Venturia inaequalis* and the time of their maturity and discharge are of much potential importance in relation to the development and prevention of epidemics of apple scab. A marked relationship was observed between the time of leaf fall and ascospore maturity. Under conditions studied, ascospores matured much earlier in leaves which fell in the early autumn than in those which remained on the tree until late autumn or early winter. Temperature and moisture were shown to be factors of cardinal importance in determining the rate of development of ascocarps.

The work of Frey and Keitt (14) shows periodicity of ascospore discharge in 1917. The presence of an adequate amount of water was the most important requisite for spore discharge. Wetting by dew did not cause discharge. Conidia of the scab fungus were found in the air only during rainy periods particularly when rains were accompanied by strong wind.

Delaware: Adams (1) showed that the prevalence of the disease was found to be associated with ascospore discharge depending upon weather conditions. The heavier infection in Sussex County was found to be correlated with earlier maturity and discharge of ascospores.

Virginia: Four years of investigation at Winchester have enabled us to determine the relative control values of the so-called scab sprays. The pink and petal-fall sprays are the most important and account for approximately 80 per cent of the total control value. The 10-day spray is valued at 10 per cent and all of the remaining sprays at 10 per cent. Control values of scab sprays are correlated with ascospore ejection. The pink and petal-fall sprays are most valuable because approximately 60 per cent of all ascospore ejections are intercepted or nullified by these sprays. (Schneiderhan)

As a result of a request for special ascospore ejection data it was possible to prepare the following tables. If the same states would contribute similar data for several years, a much more comprehensive knowledge of the regional behavior of ascospore emission would result. It is suggested that these and additional states report such or similar data next year.

New York: During May, 1924 the rainfall was 4.5 inches. In 1925 it was 1.3 inches. The railroad estimate for scab-free fruit for 1924 was 46 per cent; for 1925 it was 75 per cent. Most of our scab in 1925 came late, following a late primary infection. (Massey)

Table 38. The dates of ascospore discharge, rainfall causing them, and the dates of spray application, Wayne County, New York, 1925.

Date of discharge	Rainfall (inches)	Date of spray application
May 1	.15	Delayed dormant, April 24
May 4	.30	1st pre-blossom, May 8
May 6	.15	2nd pre-blossom, May 16
May 10	.05	Calyx, May 28
May 16	.25	1st cover, June 19
May 23	.25	------
June 1	.25	------

Table 39. Dates of ascospore discharges, the extent of discharge together with rainfall causing them, and dates of spray application, New Brunswick, New Jersey, 1925.

Date	Rainfall (inches)	Spore discharge	Spray application
April 15	1.06	-	-
April 17	-	-	Pink
April 18	0.03	-	-
April 19	0.03	-	-
April 25	t	-	-
April 26	0.04	-	-
April 28	0.19	Medium	-
April 29	0.10	Medium	-
April 30	0.46	Heavy	-
May 1	0.05	Light	-
May 3	-	Light	-
May 5	0.02	Light	Petal-fall
May 6	t	Light	-
May 7	-	Light	-
May 10	0.02	-	-
May 11	1.15	Medium	-
May 12	0.01	-	7-day

Date	Rainfall (inches)	Spore discharge	Spray application
May 22	-	-	17-day
May 24	0.49	Medium	-
May 25	0.52	Light	-
May 26	-	-	-
May 27	-	Light	-
May 29	0.29	-	-
May 30	0.39	Medium	-
June 10	t	Light	-
June 14	t	Medium	-
June 16	0.14	Medium	-
June 18	t	Medium	-
June 21	t	-	-
June 22	t	-	-
June 23	0.03	-	-
June 25	0.07	-	-
June 27	t	-	-
June 28	0.04	-	-
June 30	1.39	-	-

Similar data for Moorestown show that the first spore discharge occurred on April 25. First scab infection occurred at Vineland, May 15. (Martin)

Table 40. Ascospore ejection data, Winchester, Virginia, 1925.

Date	Rainfall (inches)	Spore ejection	Spray application
April 10	.04	Light	Delayed dormant, March 26
April 14	.50	Heavy	Pink, April 12-16
April 17	.10	Light	- - -
April 23	.10	Heavy	- - -
April 25	.98	Very heavy	- - -
April 26	.10	Light	Petal-fall, April 27
April 28	.45	Heavy	- - -
April 29	.38	Light	- - -
April 30	.59	Medium	- - -
May 4	.40	Light	- - -
May 5	.08	Light	10-day, May 11
May 22	.74	Light	- - -
May 29	.19	None	4-weeks, May 29

First scab appearance May 10.
Most important spray - Pink.
Unusually short ascospore discharge period of 31 days. In 1922 it was 56 days; 1923, 94 days; and 1924, 61 days.

APPLE - Scab

Table 41 indicates the importance of ascospore ejections of May in Virginia. A striking correlation exists between rainfall causing ascospore discharges in May and yearly infection.

Table 41. A four-year summary showing correlation of ascospore ejection with rainfall and scab infection on unsprayed Stayman fruits at Winchester, Virginia.

Year	Number of ejections and rainfall				Total ejections	Total rain (inches)	Total period (days)	Scab infection (per cent)
	April	May	June	July				
1922	4(1.30)*	9(3.63)	3(4.01)	0	16	9.94	56	95.5
1923	1(2.93)	4(1.12)	5(1.94)	3(3.35)	13	9.34	94	2.2
1924	3(1.70)	7(10.75)	4(5.71)	0	14	18.16	61	81.9
1925	9(3.30)	4(2.47)	0(1.82)	0	13	7.59	31	6.5

*Rainfall (inches) in parentheses. (Schneiderhan)

Scab development in Wisconsin was not sufficient to give a satisfactory test of the various fungicidal programs used.

Table 42. Dates of ascospore discharges correlated with rainfall and spray applications, Sturgeon Bay, Wisconsin, 1925.

Dates of discharge	Rainfall in inches	Spray application
April 26	trace	Delayed dormant
April 29	trace	- - -
May 4	0.03*	- - -
May 5	0.01	- - -
May 6	0.05	Pre-pink
May 11	0.01	- - -
May 13	0.01	- - -
May 14	trace	- - -
May 16	0.09	- - -
May 17	0.39	Pink
May 21	0.59	- - -
May 24	0.08	- - -
May 28	0.13	- - -
May 29	0.00	- - -
June 2	0.08	Calyx
June 4	0.26	- - -
June 5	0.02	- - -
June 12	0.36	- - -
June 13	1.45	10-day
June 14	0.17	- - -
June 15	0.61	- - -
June 17	0.04	- - -
June 26	0.06	- - -
June 27	0.09	- - -

Dates of discharge	Rainfall in inches	Spray application
June 29	0.01	- - -
July 2	0.27	- - -
July 3	0.09	- - -
July 4	0.01	- - -
July 7	0.13	- - -
July 9	0.46	- - -
July 12	0.13	- - -

* Largest number discharged this date. The heaviest discharges of the season took place between May 3 and May 30. (Keitt & Wilson)

Maryland: The following abstract was prepared from a paper by Jehle and Hunter entitled "Factors in Scab Development" read before the Maryland State Horticultural Society:

"Leaves containing perithecia of the apple scab fungus were placed in moist chambers in a greenhouse and outside. Temperature records were kept in both locations. In the greenhouse the minimum temperature was 35° F., the maximum 90°, and the average was approximately 60°. The minimum temperature outside was 13°, the maximum 77°, and the average 45°. The first ascospore discharge in the greenhouse occurred 25 days after the leaves were placed in the moist chamber. Under outside conditions the first discharge occurred 26 days after exposing the leaves. Under the conditions of this experiment, it would seem that comparatively high temperatures do not increase the rate of ascospore development and that they develop just as rapidly at an average temperature of 40° as they do at an average temperature of 60°."

West Virginia: The data on ascospore discharge for Jefferson and Berkeley Counties, West Virginia, are practically the same as for Winchester. A letter from E. C. Sherwood, (West Virginia) to F. J. Schneiderhan, (Virginia), under date of January 11, 1925, states, "You may know, however, that your data at Winchester correspond exactly with my field notes. I remember checking them with your records at the time I visited your laboratory. You have my authority, therefore, for using your own, (Winchester), notes as typical of our conditions in that section." (Sherwood)

Pennsylvania: The dates of first ascospore ejection in Pennsylvania in 1925 were as follows:

April 16-17	Bedford and Alleghany Counties
April 19	Philadelphia and Delaware Counties

April 21	Center County
April 23	First heavy discharge in Center County
April 30	Franklin and Venango County

You will note from these dates that conditions in Pennsylvania are far from uniform. The most important spray for scab control varies with the region of the state under consideration. In some regions this was the delayed dormant and in others as late as the pink. (Thurston)

Tennessee: First ascospore discharge at Knoxville was on March 28. This was not general. On April 12 an abundant discharge occurred. The dates of spray application were: delayed dormant, March 10; pre-pink, March 18; pink, March 24; calyx, April 16; 10-day, April 26; five-week, latter part of May. Period of heaviest discharge was just prior to April 12. The most important scab spray was the pink spray. First scab appearance May 15. (Andes)

Illinois: No data on period of heaviest ascospore ejection but probably no discharge at all to speak of. I collected leaves containing perithecia here at Urbana early in April and found they would discharge spores when moistened, but we did not have sufficient rains following the maturing of the ascospores to bring about discharge. (Anderson)

Minnesota: Apple scab, ordinarily considered to be one of the most injurious diseases of apples in Minnesota, was of negligible importance, even in unsprayed orchards, during the season of 1925. Primary infection spots, which usually appear on the leaves about the middle of May, were not reported until the middle of June and then only a few were found. No scab was reported on the fruit at any time during the summer and very little appeared on the leaves until late fall, at which time secondary infection spots became quite abundant. The slow start of apple scab and its failure to spread until late fall was undoubtedly due to weather conditions. Usually, ripe perithecia are abundant shortly after the first of May and before the leaf buds are open. Ripe perithecia, in the past season, were very scarce up to the middle of May, probably because of the extremely dry weather during April and the early part of May. At no time were perithecia abundant. (Sect. Pl. Path.)

The following information was reported by Peterson of the Section of Plant Pathology, University of Minnesota.

Table 43. The probable dates of ascospore discharges in Minnesota in relation to dates of spray applications in 1925.

Date	Rainfall (inches)	Probable spore discharges	Spray dates
May 11	.05	Probably first spore discharge	Dormant, April 27

Date	Rainfall (inches)	Probable spore discharges	Spray dates
May 15	.25	Probably period	Pink, May 1
May 16	.25	of heaviest dis-	
May 19	1.00	charge	Calyx, May 20
June 1	.05	Probably some dis-	10-day, May 31
June 2	.07	charge at these	
		dates	

First primary infection noted June 20.
No 5-week sprays applied.
Results: No scab in sprayed plots or in checks.

Dates of first appearance of scab in 1925

The variation in the dates of first appearance of scab within any particular state from year to year may be wide. Considering an area as large as the United States with the disease occurring in every state, this variation is still greater. In 1925 the earliest appearance of scab was noted on April 17 in Delaware (Adams). The latest initial infection by scab was observed on June 22 in New Hampshire (Butler). In Minnesota, as reported by the Section of Plant Pathology, "In the Twin Cities region and southern part of the state, primary infections apparently took place about June 1 which is approximately one month late for Minnesota."

In view of the fact that scab infection through the season may occur in several distinct cycles, as reported in Virginia and recorded on page 6 of the 1924 Supplement, the importance of the date of initial appearance may not be very great in any particular year. A more important consideration in describing an epiphytotic of scab is the date of maximal appearance which depends largely upon the periodicity of rainfall, the chief causative factor of primary and secondary infection. It is true that the extent of primary infection has an important bearing on secondary and total yearly infection, but the date of first appearance of scab may not be, and usually is not, at the peak of the primary infection cycle. We need more data from the various states relative to the seasonal behavior of the scab fungus following initial infection.

In New York, according to Bucholz, "There was very little infection early in the season. In fact it was not noticed very much before summer. With rainy periods in July, scab began to be apparent and by September a considerable percentage developed."

Dates and location of earliest reported appearance of scab, 1925

April 17	Seaford	Delaware	May 18	Dutchess Co.	New York
May 10	Winchester	Virginia	May 26	Orono	Maine
May 10	Berkeley Co.	West Virginia	May 28	Amherst	Massachusetts
May 13	Milford	Connecticut	June 4	Burke Co.	North Carolina
May 15	Vineland	New Jersey	June 11	St. Paul	Minnesota
May 15	Vincennes	Indiana	June 22	Durham	New Hampshire
May 15	Urbana	Illinois			

APPLE - Scab

Of the states reporting dates of first appearance of scab, seven reported later, five earlier, and one the same date as in 1924.

Varietal susceptibility

The data on varietal susceptibility contributed by the collaborators this year were very fragmentary and, therefore, impossible of compilation in a representative manner. The same criticism was made for the 1924 data. The question of varietal susceptibility to scab is an important one. An examination of the data presented during the past eight years shows wide differences. For instance, in 1925 Jonathan was reported as very susceptible in New Mexico, while in Virginia this variety is known to be fairly resistant. Other examples could be cited.

Control

From a country-wide standpoint apple scab was easily controlled by proper spraying in 1925. The data presented by the collaborators indicate that where-ever the pre-pink, pink, petal-fall, and 10-day spray were carefully applied, scab control was very satisfactory, except where late-season infection occurred.

The following reports indicate in a brief manner the scab control status in 1925.

Maine: Unsprayed Ben Davis plot showed 11 per cent of leaves infected and 1 per cent of fruit. In nearby commercial Ben Davis orchards, sprayed four times, no scab was seen. Nearby unsprayed Ben Davis commercial orchards up to 45 per cent scab on fruits. McIntosh sprayed five times, trace on fruits. No twig infection on trees. Nearby commercial orchards of McIntosh up to 96 per cent scab; sprayed five times, up to 85 per cent scab. (Folsom)

Massachusetts: Continued wet weather during July has greatly increased secondary infection especially where the usual spray schedule was not closely followed. (Osmun & Davis)

New York: The most important sprays happened to be the calyx in Ontario a.. Genesee Counties, and pink along the Lake region, that is, in Niagara, Orleans, Monroe, and Wayne Counties. (Massey)

Delaware: Mostly leaf infection. Only slight fruit infection in unsprayed orchards. (Adams)

Maryland: Showing up on all unsprayed or poorly sprayed trees on leaves and fruits. None noted on twigs as was the case last year. Not so bad as last year. (Jehle)

Virginia: Scab was easily controlled in 1925. Favorable weather conditions for both ascospore ejection and infection occurred between the pink, petal-fall, and 10-day spray but the unprecedented drought checked the spread of the disease. There was practically no secondary scab infection in northern Virginia in 1925. (Fromme & Schneiderhan)

Ohio: Of minor importance this year where any type of spraying or dusting has been done. Weather conditions were not favorable for its development. (Young)

Indiana: Not serious except in unsprayed trees. (Gardner)

Illinois: The season started with unusually high temperatures. This resulted in practically the entire absence of the pre-bloom infection of apple scab. I examined hundreds of trees for scab where in previous years one could not glance at a tree without seeing scab spots, yet this season I was able to find but a very few infections. I am of the opinion that there has never been a season more unfavorable for apple scab. (Anderson)

Michigan: There is very little fruit infection on unsprayed trees. Considerable late leaf infection is now showing up. (Bennett)

Missouri: Heavy loss in unsprayed orchards in Dallas, Green, and Polk Counties. (Maneval)

Oregon: Five scab sprays with dry lime-sulfur or lime-sulfur followed by sulfur at calyx, 15 days, and 30 days applied. Bad weather conditions mainly responsible for severity. In Lane County according to Fruit Inspector C. E. Stewart, loss was total on unsprayed trees in many cases; and in some cases 15 to 35 per cent in sprayed orchards. (Barss)

According to a letter from Childs (Hood River), "In years past we have found that no particular spray is the most important one; this importance varying with seasonal conditions. On the average, I believe the delayed dormant and pink applications are the most important considering the climatic conditions in this area."

For the control of apple scab in scabby orchards Butler (8) recommends a pre-pink, pink, and calyx spray of Bordeaux mixture 2-2-50, and a 14-day with lime sulfur 1-50.

Recent literature

1. Adams, J. F. The spore discharge of the apple scab fungus in Delaware. Delaware Agr. Exp. Sta. Bul. 140: 3-16. 1925.

2. __________ and T. F. Manns. (Report of) Department of plant pathology and soil bacteriology. Delaware Agr. Exp. Sta. Bul. 139: 24-29. 1925.
Notes on the value of casein compounds in connection with orchard spraying.

3. Anderson, H. W. Apple and pear scab and apple blotch. Trans. Illinois Sta. Hort. Soc. 58 (1920): 264-370. 1925.

4. Bagenal, N. B., W. Goodwin, E. S. Salmon, and W. M. Ware. Spraying experiments against apple scab. Jour. Min. Agr. Great Britain 32: 137-149. May 1925.
Working on the susceptible variety Bismarck in England, they

found scab lesions on leaves before blossom opening necessitating the application of a pre-pink spray. Bordeaux mixture (8-8-100) and lime sulfur (1 -29) produced the best results. Lime-sulfur caused dropping of young fruits while Bordeaux mixture did not.

5. Ballou, F. H. and I. P. Lewis. Spraying for apple scab and apple blotch. Ohio Agr. Exp. Stat. Monthl. Bul. 10: 50-52. Mar.-Apr. 1925.

6. Birmingham, W. A. Experiments for the control of black spot of apple due to the fungus Venturia inaequalis (Cke) Aderh. Agr. Gaz. New South Wales 37: 665-666. Sept. 1925.

7. Broadfoot, H. Control of black spot Venturia inaequalis (Cke.) Aderh. Agr. Gaz. New South Wales 36: 737-750. Oct. 1925.

8. Butler, O. Control of apple scab. New Hampshire Agr. Exp. Sta. Circ. 25: 1-8. 1925.

9. Doran, W. L. Experiments on the control of apple scab and black rot and spray injury in 1924. Massachusetts Agr. Exp. Sta. Bul. 222: 1-10. 1925.

Primary infection of leaves was prevented equally well by lime-sulfur solution, Bordeaux mixture, and dry-mix sulfur-lime. The addition of calcium caseinate spreader to a lime-sulfur and lead arsenate spray did not result in increased protection against scab.

10. Frey, C. N. The cytology and physiology of Venturia inaequalis (Cke.) Wint. Trans. Wisconsin Acad. Sci. 21: 303-343. 1924.

Experiments thus far performed show that the minimal temperature for infection is not more than 6° C. and the maximal not less than 26° C. It is probable that further work will extend the lower temperature limit. The optimal temperature for infection was near 20° C. which agrees closely with the optimum for germination of ascospores and growth of _Venturia inaequalis_.

11. __________ and G. W. Keitt. Studies of spore dissemination of Venturia inaequalis (Cke.) Wint. in relation to seasonal development of apple scab. Jour. Agr. Res. 30: 527-540. 1925.

12. Keitt, G. W. Studies of apple scab infection under controlled conditions. (Abstract) Phytopath. 16: 77. Jan. 1926.

13. __________ and E. E. Wilson. Studies on the development of the ascigerous stage of Venturia inaequalis in nature. (Abstract) Phytopath. 16: 77. Jan. 1926.

14. Kendall, J. C. Toxicity of fungicides to parasitic fungi. In New Hampshire Agr. Exp. Sta. Bul. 216 (Rept. Director 1924): 8-9. 1925.

Doran (9) carried on experiments to determine the effect on

spores of adding arsenious oxide, lead arsenate and calcium arsenate to lime-sulfur solutions. It is reported that lead arsenate through its decomposition, and arsenious oxide increased the toxicity of the solutions but the addition of calcium arsenate only slightly decreased the percentage of spore germination.

15. Salmon, E. S., and W. M. Ware. Biological observations on apple "scab" or "black spot". Jour. Pomol. and Hort. Sci. 4: 230-249. June 1925.

16. Schenk, P. J. Appel- en pereschurft. Floralia 46: 244-245. Apr. 17, 1925.

17. Stover, W. G. Apple scab costs Ohio 750,000 bushels a year. Agr. Student Ohio Univ. 31: 184-185. Apr. 1925.

18. Thomas, P. H. Black spot control. Tasmania Dept. Agr. Fruit Div. Bul. 116: 1-6. 1925.

19. ____________ Black spot control. Fruit, Flower & Veg. Trades Journ. 48: 234-235. Aug. 29, 1925.

20. Whetzel, H. H. The story of the apple scab and its control. Proc. New York State Hort. Soc. 70: 159-162. 1925.

21. Young, H. C. and R. C. Walton. Spray injury to apple. Phytopath. 15: 405-415. 1925.

BLOTCH CAUSED BY PHYLLOSTICTA SOLITARIA ELL. & EV.

Geographic distribution

As in previous years the distribution of blotch was limited largely to states south of the 42° of latitude. Most of the reports for 1925 came from east of the Mississippi. A total of twelve reports was received from east of the Mississippi and only one west of it.

Relative prevalence

Considering the country as a whole blotch was considerably less prevalent in 1925 than in 1924 and the average year. Comparing the 1925 prevalence with that of 1924, only Ohio and Tennessee reported more, while Kentucky, Illinois, Indiana, Kansas, West Virginia, Virginia, Delaware, Maryland, and New Jersey reported less. Wisconsin and Alabama reported the same as in 1924. A comparison of the 1925 prevalence with normal shows that no state reported more than normal this year, while the majority of collaborators reported less. Normal prevalence was reported from Maryland, New Jersey, Tennessee, Wisconsin, and Alabama.

APPLE - Blotch

Losses

Losses from blotch for 1925 were a minor consideration in fruit production, the data indicating that they were considerably below normal, and since the apple crops in the blotch areas were smaller than usual the total aggregate loss in the United States was comparatively slight.

Table 44. Estimated losses from blotch as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	Alabama	1	Maryland, Indiana, Illinois, Arkansas
4	Kansas, Kentucky	.75	New Jersey
3	North Carolina, Iowa, Tennessee, Mississippi	trace	Delaware, Virginia, West Virginia, South Dakota, Nebraska
2	Ohio, Texas		

West Virginia: Much more than usual on Ben Davis in Berkeley and Jefferson Counties. (Sherwood)

Virginia: As prevalent as usual in infested orchards but not checked by the drouth as scab and other diseases. (Fromme)

Oklahoma: This is probably the worst disease of the fruit, affecting fully 60 per cent of the fruit of Missouri Pippin and Ben Davis in unsprayed orchards. (Rolfs)

Arkansas: Very little in principal apple section in Washington and Benton Counties. Common at lower altitudes in central and southern parts where little spraying is done. (Young)

Ohio: Blotch is more general throughout the southern part of the state than it has been for several years and is causing considerable loss. (Young)

Illinois: Blotch was very late appearing due to dry weather and when it finally appeared the few primary infections were not numerous enough to cause loss. (Anderson)

Weather relations

The lack of normal rainfall appears to be the most important factor inhibiting the disease this year. This lack of rainfall prevented the normal exudation of spores from the cankered twigs, resulting in a minimum of infection. Young of Ohio reports, "Unfavorable temperature relations." Gardner of Indiana says, "Hot, dry April and May unfavorable." Anderson of Illinois reports, "An extremely dry spring resulted in almost complete control of apple blotch.

Dates and location of earliest reported appearance of blotch, 1925

April	Franklin Co.	Kentucky	June 11	Lawrence	Indiana
May 18	Pulaski	Illinois	June 15	Holmdel	New Jersey
June	Lexington	Kentucky	October 6	Wild Rose	Wisconsin
June 5	Crozet	Virginia			

Spore emergence and infection data

New Jersey: Thirty apples were bagged each week starting May 18 and continuing until June 30. On unbagged apples first infection was observed on June 22. All apples bagged on May 18 were clean. Of those bagged May 26, 1.1 per cent showed blotch, those bagged June 1 showed 0.33 per cent blotch, while 50 per cent of the fruit bagged on June 8 was infected. Most of the apples bagged after this date showed heavy infection. In this orchard the 17-day application was made on May 26 and the 28-day spray, June 24. (Martin)

Virginia: First fruit lesions noted at Crozet June 5 and at Winchester June 12. Records of exudation of conidia from twig cankers obtained at both Crozet and Winchester to date are as follows:

Crozet	Winchester
May 24	May 24
June 6	June 7
June 24	June 18
June 27	June 24
- - -	July 4

(Fromme)

Varietal susceptibility

The data on varietal susceptibility was not specific enough to compile a table. We shall, therefore, quote the collaborators.

New Jersey: Most severe on Smith Cider. Found on Alexander. (Martin)

Wisconsin: Most noticeable on Northwest Greening and an unnamed yellow sweet apple. (Vaughan)

Virginia: The only susceptible varieties found in Virginia are Northwestern Greening, Ben Davis, and Limber Twig. (Schneiderhan)

Tennessee: Most serious on Dutchess, Early Harvest, and Ben Davis. Not serious where thoroughly sprayed. (McClintock)
In nursery. Early varieties most susceptible. (Fackler)

An interesting report on varietal susceptibility for 1925 was that of Gardner. He says:

"The most recent discovery is that of the presence of apple blotch cankers on French-grown seedlings. This at once raises a question as to whether or not this disease occurs in France."

Quoting the same collaborator further:

"In addition to previous records, fruit infection has been found on Baldwin and on twigs and fruit of Cortlandt. We have found blotch in seven nurseries in southern Indiana, on Kansas grown seedlings and on French seedlings in one nursery."

Blotch control

Control data were reported from Virginia by Schneiderhan and from New Jersey by Martin.

It is apparent that in the New Jersey experiment, block 3, sprayed with 1-40 lime-sulfur, two and three weeks after petal fall, and with Bordeaux, four and six weeks after petal-fall, produced the best results.

Table 45. Blotch control results in New Jersey, 1925.

Block		Clean per cent	Salable per cent	Unsalable per cent
1	Pick	77.6	19.5	2.9
	Drop	66.1	10.1	23.9
2	Pick	80.5	16.4	--
	Drop	--	--	--
3	Pick	86.3	12.1	1.6
	Drop	79.3	9.4	11.3
4	Pick	48.1	30.2	21.7
	Drop	54.4	12.8	32.8
Check	Pick	11.5	30.8	57.7
	Drop	8.2	3.7	88.1

All except the check plot received the delayed dormant, pink, petal-fall, and 7-day applications of 1 to 40 lime sulfur. Block 1 received also an application of 1 to 40 lime-sulfur at 17 days and 2-4-50 Bordeaux mixture 4 and 6 weeks after petal-fall. Block 2 treated in a similar manner was given an additional application of Bordeaux mixture 8 weeks after petal-fall. Block 3 received 1 to 40 lime-sulfur 2 and 3 weeks after petal-fall, the 17-day spray being omitted, and then received applications of Bordeaux 4 and 6 weeks after petal-fall as in the case of block 1. Block 4 was sprayed with lime-sulfur 17 days and 4 and 6 weeks after petal-fall. (Martin)

In Virginia the relative control values of the three important blotch sprays were determined. The program of sprays was as follows: Ten days after petal-fall (lime-sulfur 1 to 40); four weeks (Bordeaux, 3-5-50); seven weeks (Bordeaux 3-5-50). Of the four plots used, one received all of the sprays and in each of the other plots one spray was omitted which enabled us to check the control effected against the full program. In a fifth plot, dry-mix sulfur-lime was applied three times. The control data follow:

Table 46. The relative values of three blotch sprays on Northwestern Greening fruit at Winchester, Virginia, 1925.

Plot	Spray omitted	Blotch-free fruit (per cent)	Number of fruits examined
1	10-day (May 15)	92.7	5691
2	4-week (June 2)	59.4	2453
3	7-week (June 29)	94.0	3454
4	None (full program)	95.9	3168
5	Full program (Dry-mix only)	78.4	7276
Check		34.2	4682

1. Four weeks spray most important for blotch control in 1925.
2. Dry-mix sulfur-lime not as effective as lime-sulfur and Bordeaux this year.
3. Value of four weeks spray is correlated with conidial exudation. It was the most important blotch spray because it nullified approximately 58 per cent of total conidial exudations. (Schneiderhan)

Delaware: Trees with twig infection carefully sprayed with Bordeaux showed no fruit infection. Dry weather against prevalence of the disease this year. (Adams)

Indiana: Spraying at petal-fall two, four, and six weeks gave good control on Dutchess and Ben Davis in southern Indiana. Bordeaux mixture 2-4-50 and lime-sulfur 1 to 40 effective. Blotch was not at all difficult to control this season. Canker eradication in young orchards gives excellent promise of complete elimination of the disease with indications that special blotch sprays may be omitted by the fourth year after the cankers are removed. (Gardner)

Guba (2), (Illinois) for the control of apple blotch, recommends pruning and spraying. All pruning should be done prior to the application of the dormant spray. For the dormant spray, commercial lime-sulfur 1 to 8 or copper sulfate 1 to 10 is recommended. The dormant spray is to be followed with two applications of lime-sulfur at intervals of two to three weeks after petal-fall followed by three or four applications of Bordeaux mixture.

According to Ballou and Lewis (1)

> "The three-year average per cent of sound blotch-free fruit produced on the seven plots on which Bordeaux of different strength was used are 97.8, 98.9, 99.1, 98.7, 99.3, 99.7, and 100 respectively. The first plot, 97.8 per cent, was sprayed with 0.75-2.25-50 Bordeaux; the last, 100 percent, with 2-6-50 Bordeaux. The three-year average for the unsprayed check plot is 14.7 per cent. The five lime-sulfur plots gave three year averages of 93.4, 96.7, 98.1, 98.5, and 99.5 per cent respectively."

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McClintock and Sherbakoff (4) recommend that for blotch control on early apples at least four summer sprays be applied beginning with the calyx spray and following at intervals of two weeks. Either lime-sulfur or Bordeaux if thoroughly applied should control blotch.

Recent literature on blotch

1. Ballou, F. H. and I. P. Lewis. Spraying for apple scab and apple blotch. Ohio Agr. Exp. Sta. Month. Bul. 10: 50-52. Mar.-Apr. 1925.

2. Gubs, E. F. Phyllosticta leafspot, fruit blotch, and canker of the apple: Its etiology and control. Illinois Agr. Exp. Sta. Bul. 256: 481-557. 1925.

3. Hesler, L. R. Apple blotch control. Proc. Tennessee Hort. Soc. 19: 49-55. 1924.

4. McClintock, J. A., and C. D. Sherbakoff. Spraying early apples for blotch control. Tennessee Agr. Exp. Sta. Bul. 132: 1-8. 1925.

5. Martin, W. H. Plant diseases of New Jersey VIII. Blotch. A serious disease of the apple. New Jersey Agr. 7 (12): 10-11. Dec. 1925.

6. Thomas, H. E. Apple blotch in New York state. Phytopath. 15: 246-247. 1925.

7. Walton, R. C. Apple Blotch. Pennsylvania Agr. Exp. Sta. Bul. 196: 17-18. July 1925.

CEDAR RUST CAUSED BY GYMNOSPORANGIUM JUNIPERI-VIRGINIANAE SCHW.

Geographic distribution

The geographic distribution of cedar rust as reported for 1925 was similar to other years. This, of course, is due to the peculiar nature of the disease and is determined very largely by the distribution of the red cedar. Cedar rust infection in 1925 was exceptionally light. Only three states reported greater prevalence than for 1924 or normal. These states are Iowa, Minnesota, and Kansas.

In Minnesota according to a letter from E. C. Stakman,

"The explanation lies in the fact that we had tropical rains almost from June 1 to about June 20. There was a total of 4.75 inches of rain during June,........ There also were many minor showers, at least almost every day and sometimes several times a day. Not only that but there were rather heavy winds. The conditions, therefore, were ideal for the gelatinization of the cedar galls, for the germination of the teliospores and the distribution of sporidia."

Considering the fact that twenty-five states reported on cedar rust and that in most of them the disease was exceptionally slight, we conclude that 1925 was a year of comparatively slight infection for the country as a whole.

Table 47. Prevalence of cedar rust in 1925 compared with 1924 and with normal.

Compared to 1924			Compared to normal		
More	Less	Same	More	Less	Same
Minn.	Mass.	Conn.	Minn.	Mass.	Conn.
Iowa	Del.	Ala.	Iowa	Del.	Md.
Kans.	Md.	Mich.	Kans.	Va.	Ala.
--	Va.	Wis.	--	W. Va.	Mich.
--	W. Va.	S. D.	--	S. Car.	Wis.
--	S. Car.	N. Car.	--	Ark.	S. D.
--	Okla.	Tenn.	--	Ohio	N. Car.
--	Ark.	--	--	Ind.	Tenn.
--	Ohio	--	--	Ill.	--
--	Ind.	--	--	--	--
--	Ill.	--	--	--	--

Losses

The average loss from cedar rust in the United States for the six-year period, 1918-1924, inclusive was approximately 1 per cent. The loss in 1925 is considerably below that average. Even in states where cedar rust is usually of great importance, like Pennsylvania, West Virginia, Virginia, Maryland, and Ohio, the disease caused only slight damage in 1925.

Table 48. Estimated losses caused by cedar rust in the United States in 1925.

Percentage loss	States reporting	Percentage loss	States reporting
4	Iowa	trace	Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, South Carolina, Ohio, Indiana, Illinois, Michigan, Wisconsin, Missouri, North Dakota, Nebraska, Kentucky Alabama, Mississippi Oklahoma
3	Virginia		
1.5	North Carolina		
1	New York, West Virginia, South Dakota		
.5	Connecticut, Maryland, Minnesota, Kansas, Tennessee, Arkansas		

Massachusetts: Crabapple trees which have been highly infected with the disease bear very little this year. (Davis)

APPLE - Cedar rust

Connecticut: Little serious injury reported. (Stoddard & Hunt)

New York: Cedar rust on foliage is very heavy in some orchards of Rome Beauty, Wealthy, York Imperial, and Jonathan. (Wagoner)

Delaware: Considerable reduction in prevalence during the last two years. (Adams)

Virginia: Caused considerable injury in orchards subject to severe exposure of cedars but generally lighter than last year. (Fromme)

West Virginia: Much less this year than in 1924. (Giddings)

Tennessee: Some fruit spot and some serious leafspot and defoliation. (McClintock)

Oklahoma: Comparatively little damage caused by this organism during the present year. (Rolfs)

Arkansas: Much less than last year. Not enough to cause defoliation in any isolated cases. (Young)

Indiana: Light foliage infection; trace on fruit. Too dry in April and May. (Gardner)

Wisconsin: Rust has been observed as less than usual this year at Gays Mills. (Vaughan)

Minnesota: Considerable rust on apples has been found in certain localities particularly Albert Lea, Taylors Falls, and Fillmore County. (Sect. Plant Path.)

Missouri: There has been very little cedar rust this year. (Bregger)

Weather relations

With local exceptions, weather conditions in the United States for 1925 were very unfavorable to infection. The important factor, as in some other diseases was the absence of normal rainfall, which in the case of cedar rust is necessary for the protrusion of the teleosori and subsequent production of spores.

Spore discharges

The following data relating to spore development were received from J. F. Adams of Delaware:

"Telia maturing on cedars April 24. Pycnia on leaves of Early Ripe observed May 7. Very little infection observed to date (July 15) and considerable reduction in prevalence in last two years."

APPLE - Cedar rust

From Virginia, which has for years reported the greatest economic loss from cedar rust in the United States, the following statement concerning spore discharges was submitted.

"A heavily infected small cedar tree planted in the laboratory grounds at Winchester was used for demonstration of infection and spore discharge. It was planted between two small York trees, one of which was covered with a muslin bag, the other uncovered. Defoliation to the extent of 80 per cent occurred June 15 on the uncovered tree. Removing the muslin bag July 19 revealed no infection on the covered tree. This demonstration of infection was used to good advantage as propaganda for cedar eradication campaigns."

Table 49. The dates and the nature of discharges of teliospores from cedar tree galls, together with rainfall in inches, Winchester, Virginia.

Date	Rainfall (inches)	Spore discharge	Date	Rainfall (inches)	Spore discharge
April 2	.06	Slight	May 5	.08	Slight
April 10	.04	Slight	May 10	.15	Medium
April 14	.50	Heavy	May 22	.74	Heavy
April 17	.10	Heavy	May 24	.91	Heavy
April 23	.10	Heavy	May 29	.19	Slight
April 25	.98	Heavy	June 7	.12	Medium
April 26	.10	Slight	June 8	.50	Medium
April 28	.45	Heavy	June 14	.15	Medium
April 29	.38	Heavy	June 18	.20	Medium
April 30	.59	Heavy	June 23	.48	Very slight
May 4	.40	Heavy			

(Schneiderhan)

Dates and locations of earliest reported appearance of cedar rust, 1925

May 7	Seaford	Delaware	June 11	North Stonington	Connecticut
May 11	Winchester	Virginia	June 11	Raleigh	North Carol
May 20	Amherst	Massachusetts	June 11	Knox County	Indiana
May 25	Springhill	Tennessee	June 23	Kandiyohi County	Minnesota
June 8	Orange County	New York	July 7	Shiloh	New Jersey
June 9	Clemson College	South Carolina	July 20	Darlington	Wisconsin

Varietal susceptibility

New York, Ulster County: On Rome Beauty, Wealthy, York Imperial, and Jonathan. (Chupp)

New Jersey: Found on Star. (Martin)

Virginia: Susceptible varieties in Virginia are Rome Beauty, York Imperial, Jonathan, and Ben Davis. (Fromme)

Tennessee: Less on Transparent, more on Early Ripe and Early Harvest. (McClintock)

Wisconsin: Confined mostly to Wealthy as far as economic importance is concerned. Found on twigs of Goodhue variety at Waterloo. (Vaughan)

Minnesota: Ornamental crab (*Pyrus ioensis*) extremely susceptible. Twigs as well as leaves attacked. Wealthy most susceptible. (Sect. Plant Path.)

Control

Such data as were received for control deal primarily with the eradication of cedar trees. An idea of the extent of cedar tree eradication in Virginia will be gained from a digest of data furnished by W. J. Schoene, of the Virginia State Crop Pest Commission, under whose direction this work was carried out. This information is included here because it represents a successful effort on a large scale to eradicate the intermediate host of a heteroecious fungus affecting apples.

"The total acreage reported cut over in 1922-1923 was approximately 200,000, at an expense to the growers of approximately $30,000. From 1923 to 1925 an additional 61,817 acres were cleared of cedars. The cost of removing cedar sprouts during this period was $3,859.36. A most conservative estimate of the returns in increased production resulting from cedar eradication for one year (1923) is $300,000."

Virginia: Seasonal weather conditions will determine very largely the intensity of infection by cedar rust. In 1925 a safe cedar-free zone was approximately two miles in extent. Cedar rust infection in 1925 was the lightest during the past four years. The two-mile zone would probably not be so safe in a year of heavy infection. Notable decrease of rust injury is found on apples within a mile of cedar trees.

Table 50. Leaf infection of York in relation to distance from uncut cedar tree areas, Mt. Jackson, Virginia, 1925.

Distance (miles)	Percentage of leaf infection	Average number lesions per leaf
1	77.3	11.7
1-1/2	63.3	8.10
2	57.2	4.32
2-1/2	20.0	0.32

Spraying as a means of cedar rust control of apples is not practicable. Data prepared from plots of fully sprayed and unsprayed Rome Beauty during four years, 1922-1925, indicate that no appreciable control of cedar rust resulted from applying a full program of sprays. (Fromme & Schneiderhan)

According to Schoene et al (4) it appears that orchards in which the average infection does not exceed two or three spots per leaf will mature the crop normally. Injury is noticeable when the number exceeds three spots, even under favorable conditions for apple production. Serious defoliation and reduction in crop occurs when the number of spots reach 8 to 10 per leaf, and as many as 20 spots per leaf produce such severe injury that the fruit stops growing when about one-third mature.

Recent literature on cedar rust

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2. Campfield, W. S. Cedar rust control. Rep. Virginia State Hort. Soc. 28: 33-38. 1924.

3. McCubbin, W. A. Apple rust and its control. Bul. Pennsylvania Dept. Agr. 8 (15): 1-10. Sept. 1, 1925. General bulletin No. 411.

4. Schoene, W. J., C. R. Willey, and L. R. Cagle. Cedar spots and fruit loss. Quart. Bul. Virginia State Crop Pest Commission 6 (4): 1-8. 1925.

5. Talbert, T. J. Cedar rust of apples in Missouri. Missouri Agr. Exp. Sta. Circ. 135: 1-8. Apr. 1925.

6. Waite, M. B. Apple cedar rust control. Proc. Ann. Blister Rust Conf. 10: 29-34. 1925.

BLACKROT OF APPLE CAUSED BY PHYSALOSPORA MALORUM (PK.) SHEAR

Geographic distribution, relative prevalence, and importance

Twenty-seven states reported on blackrot in 1925. No radical difference in geographic distribution was noted. It may be stated again, however, that blackrot is more severe in the southern, south central, and eastern states where the temperature is slightly higher than in the northern states. Of the twenty-seven reports submitted, eight reported the same prevalence as in 1924, five reported less, and only two reported more. Those reporting the same prevalence as 1924 are Connecticut, Ohio, Michigan, Minnesota, Iowa, Kansas, Tennessee, and Kentucky. Those reporting less are Delaware, Maryland, West Virginia, South Carolina, and Indiana. The two states reporting more were New Hampshire and Virginia.

In summing up the statements on relative prevalence we conclude, that in 1925 blackrot was slightly less prevalent in the United States than in 1924 or during the average year. Following are some of the reports from collaborators.

New Jersey: Blackrot is comparatively unimportant this year being reported only from a few orchards. (Martin)

Maryland: Plentiful in unsprayed or improperly sprayed orchards, especially where dead wood has not been pruned out. (Jehle)

West Virginia: Quite prevalent. (Giddings)

Missouri: There has been a moderate amount of blackrot. (Bregger)

Nature of injury

It was thought worth while to include comments from collaborators regarding the relative importance of fruit, leaf, and branch infection in their respective states.

New Jersey: Observed on leaves, fruit, and twigs. (Martin)

Delaware: Slight leaf infection. Early fruit infection. (Adams)

Virginia: Blackrot injury in Virginia results from leaf and fruit infection, the latter being most important. A striking relation existed in Virginia between blackrot infection and fruit injury caused by codling moth. This insect was the cause of the heaviest losses to apples in Virginia in 1925. The heavy prevalence of blackrot this year is due very largely to worm injury through which the fungus gained entrance. A slight amount of blackrot infection also follows calyx-end injury. (Schneiderhan)

Tennessee: Leafspot, defoliation, and some fruit rot. (McClintock)

Kentucky: Leafspot quite common. (McGill & Valleau)

South Carolina: Cankers on nursery stock moderate. Fruit rot in orchards slight. (Fenner)

Alabama: Leafspotting and defoliation. Some fruit rot. (Miles & Blain)

Arkansas: Frog-eye leafspot very abundant on unsprayed trees. (Young)

Indiana: Fruit rot following bruises, hail injury, or worm injury. Some calyx infection. (Gardner)

Michigan: Cankers on limbs. (Bennett)

Minnesota: Follows fireblight; slight injury to fruit. No leafspot recorded this year. (Sect. Plant Path.)

Missouri: In most cases blackrot follows hail injury. (Bregger)

Losses:

The losses from blackrot injury in the United States this year were less than normal. The accompanying table 51 gives the percentages reported from the different states.

Table 51.- Estimated losses from blackrot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
--	Tennessee	trace	Maine, New Hampshire, Vermont, New York, New Jersey, West Virginia, South Carolina, Illinois, Minnesota, Kansas, Kentucky, Colorado, Louisiana, South Dakota, California
4	Maryland		
3	Georgia, Iowa, Ohio		
2	North Carolina		
1.5	Virginia		
1	Connecticut, Michigan, Rhode Island, Mississippi		
.5	Delaware, Indiana, Alabama		

Weather relations

The effect of weather noted on other diseases of fruits applies also to blackrot. Since spore exudation results only from soaking of cankered twigs, the periodicity and amount of rainfall in any locality will determine largely the blackrot infection, particularly on fruit which has been injured by insects or spray material.

New York (Wayne County): This disease is appearing in larger amounts with the wet weather, but it is much less abundant than last year. (W. D. Mills, New York State Coll. Agr. Weekly News Letter, Aug. 17)

North Carolina: Less prevalent on account of drouth. (Lehman & Fant)

Arkansas: Not common this year in the apple section of northwestern Arkansas. The dry spring apparently unfavorable. (Young)

Indiana: Dry April and May unfavorable. (Gardner)

A record of first appearances of blackrot as reported by the collaborators follows:

Dates and location of earliest reported appearance of blackrot, 1925

March 28	Rodman	South Carolina	May 22	Mower	New York
April 23	Lawrence	Indiana	May 25	Columbia County	New York
April 27	Blacksburg	Virginia	June 11	North Stonington	Connecticut
May 10	Springhill	Tennessee	July 13	Wilton	New Hampshire

Varietal susceptibility

Delaware: Early Ripe leaf infection noted for April 22 and fruit infection (mostly calyx) July 9 at Seaford. (Adams)

Virginia: Mostly on Ben Davis, Grimes, Delicious, and Yorks following worm injury. Calyx injury caused by spray burn followed by blackrot mostly in Ben Davis. (Fromme & Schneiderhan)

Tennessee: Especially bad leafspot on Yellow Transparent and Dutchess. (McClintock)

Indiana: Frog-eye noted on Transparent and Rome. (Gardner)

Control

According to Doran (1)

"In the Baldwin orchard there were three times as many leaves with frog-eye leafspot on check trees as on those dusted with sulfur. In this orchard, 7.2 per cent of the fruit on the check trees became infected with blackrot, while the disease was present on only 0.9 per cent of the fruit dusted with sulfur."

Attempts made to discover the causal agent of frog-eye in Pennsylvania were reported by Walton (4) to be unsuccessful.

Fenner (2) has described a rot of apple which is very similar to blackrot, but which is caused by *Botryosphaeria ribis*. Shear et al (3) have compared the morphology of this fungus and of *Physalospora malorum*.

Recent literature on blackrot

1. Doran, W. L. Experiments on the control of apple scab and blackrot and spray injury in 1924. Massachusetts Agr. Exp. Sta. Bul. 222: 10 pp. (unnumbered). 1925.

2. Fenner, E. Aline. A rot of apples caused by Botryosphaeria ribis. Phytopath. 15: 230-234. Apr. 1925.

3. Shear, C. L., Neil E. Stevens, and Marguerite S. Wilcox. Botryosphaeria and Physalospora in the eastern United States. Mycologia 17: 98-107. 1925.

4. Walton, R. C. Black rot of apple. *In* Pennsylvania Agr. Exp. Sta. Bul. 196 (Ann. Rept. Director 1924-25): 18. 1925.

BITTER ROT CAUSED BY GLOMERELLA CINGULATA (STON.) SPAULD. & SCHRENK

During the past six years the data submitted by collaborators indicate that Virginia, North Carolina, South Carolina, Georgia, Tennessee, Alabama, and Mississippi have suffered the most severe losses from bitter rot in the United States. The status of this disease in 1925 may readily be judged by the fact that none of the above mentioned states have reported more bitter rot than usual and most of them have reported less. We infer, therefore, that this dis-

ease was not only below normal in prevalence, but that the economic losses in the country were smaller than usual.

The heaviest loss from bitter rot in the United States in 1925 was reported from North Carolina where this disease caused a total crop reduction of 3 per cent. Following is a brief table indicating the bitter rot losses in the country in 1925.

Table 52. Estimated losses from bitter rot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
3	North Carolina	trace	Maine, New York, Massachusetts, Rhode Island, Connecticut, New Jersey, West Virginia, Nebraska, South Carolina, Louisiana, Kentucky, Arkansas, Kansas, South Dakota, Colorado
2	Maryland		
1	Georgia, Alabama, Ohio, Tennessee		
.5	Virginia, Illinois		
.25	Delaware		
.1	Indiana		

Dates and location of earliest appearance of bitter rot, 1925

March 28	Rodman	South Carolina	July 6	Knox County	Indiana
May 16	Lawrence County	Missouri	August 8	New Brunswick	New Jersey
July	- - -	Illinois	August 19	Seaford	Delaware
July 3	Crozet	Virginia	September 3	Norwalk	Connecticut

No clear-cut statements concerning susceptibility or resistance of varieties were made. In Delaware the disease was reported on King David; in Virginia on Pippin, Ben Davis, and Smoke House; Indiana on Jonathan, Grimes, Transparent, and Ben Davis. The worst infection, according to Gardner (Indiana), was found on low hanging fruit. Illinois reported bitter rot on Jonathan, Ben Davis, and Grimes.

Very few reports on weather relations were received. Only three states reported more bitter rot than last year than normal. These were Indiana, Illinois, and Maryland. In Indiana, according to Gardner, "The high rainfall of July, August, and September was favorable to the disease." In Illinois, according to Anderson and Tehon, "Mid-season rains started infection but dry summer prevented further infection and trouble."

The following report on spore exudation was received from Schneiderhan of Virginia:

> "The commonest method of over-wintering of bitter rot in Virginia is in bitter rot mummies. The removal of bitter rot mummies together with a few bordeaux sprays will easily control this disease in this state. In 1925 spore exudation records were kept at Winchester. The following table of this record is presented."

Table 56. The dates and amounts of spore exudations from bitter rot mummies, together with the rainfall causing these exudations, Winchester, Virginia, 1925.

Date	Exudation	Rainfall (inches)
June 14	Slight	.15
June 18	Heavy	.20
June 23	Heavy	.48
June 24	Heavy	.76
July 4	Heavy	.33
July 15	Heavy	.70
July 21	Slight	.90

"In experimenting on the control value of bitter rot mummy removal at Winchester, it was found in 1924 and 1925 that in spite of careful demumification of certain isolated Smoke House trees, the disease appeared in mid-season and caused a total loss in two large trees. This suggested another means of carrying over the disease. An examination of twigs just above heavily infected apples showed a somewhat cankered condition, although the term 'canker' does not describe the condition of these twigs, which were roughened with partly shredded bark. As a result of inoculation experiments it was proved conclusively that these twigs were infected. This is the first report of twig infection of bitter rot north of South Carolina. Further investigations in Virginia will be conducted next year in an effort to determine, if possible, additional varieties in which the bitter rot fungus is carried over, not only in mummies, but also in twigs."

BLIGHT CAUSED BY BACILLUS AMYLOVORUS (BURR.) TREV.

This disease appeared in epiphytotic form in a large number of states this year. It was particularly severe in the largest apple production sections of the country, like New York, Michigan, Washington, and Oregon, but exceptionally heavy loss was reported also from such southern states as Georgia and Alabama.

Of the states reporting on the prevalence of blight this year, fifteen reported more than in 1924, nine reported less, and seven the same. Compared to normal prevalence, twelve reported more, ten less, and five the same. We infer, therefore, that the average prevalence in the United States is not only greater than that for 1924 but also greater than normal. A better idea of the situation in the various states can be gained from the following quotations.

Massachusetts: Severe blossom and twig infection throughout the state. Quince seems to suffer more than apple. Relatively little on pear. (Osmun & Davis)

New York: Extremely severe on apples and pears this year over the entire state. (Chupp)

Delaware: Much less than last year. Appeared last week of May and very little spread observed. (Adams)

Virginia: Slight injury. First appearance, May 10 at Winchester and Crozet. Said to increase rapidly for about a week, but after that subsided with comparatively little injury. (Fromme)

West Virginia: About as usual; no serious outbreaks. (Giddings)

South Carolina: Present in about the usual amount. (Ludwig)

Georgia: In spite of extremely dry weather blossom-blight on apples seems to be unusually bad this year. (Higgins)

Oklahoma: Twig infections abundant on Jonathan and Ben Davis early in spring. Leaf infections were abundant in June, but since then they have gradually disappeared without material damage. (Rolfs)

Arkansas: Severe on several varieties. Appeared later than last year and continued later. In general not so severe as last year but more important. (Young)

Illinois: Extremely bad throughout state. Worse blossom blight in ten years. (Anderson)

Indiana: Very serious. (Gardner)

Michigan: Blight is everywhere present and has caused heavy loss. There appeared to be an unusually high percentage of cankers active in the spring. (Bennett)

Wisconsin: Additional reports indicate fireblight to be more widespread and destructive than for many years. It is causing great damage to home orchards. (Vaughan)

Minnesota: Unusually severe on all susceptible varieties throughout the state. The most susceptible varieties of apple are gradually being killed off. Except for fireblight apples were very free from disease this year. (Sect. Plant Path.)

Missouri: Fireblight of apples has been particularly severe this season. (Bregger)

Nebraska: Much more prevalent and worse than last year. (Peltier)

Kansas: Unusually severe this spring. Worse damage in older orchards. This year's crop was decidedly reduced due to blossom-blight and next year's crop is handicapped due to spur blight. Loss conservatively estimated at 5 per cent for the state. (White)

Oregon: In the Milton-Freewater district it occurred in all orchards and on practically all varieties. (Barss)

The relative prevalence of blight is shown in table 54.

APPLE - Blight

Table 54. Relative prevalence of apple blight in 1925 compared with 1924 and average year.

State	Prevalence compared with: 1924	Average year	State	Prevalence compared with: 1924	Average year
Connecticut	same	same	Illinois	same	more
New York	more	more	Michigan	same	more
New Jersey	same	less	Wisconsin	more	more
Delaware	less	same	Minnesota	more	more
Maryland	less	less	Iowa	more	----
Virginia	less	less	Missouri	same	----
West Virginia	more	less	South Dakota	less	less
Kentucky	more	more	Nebraska	more	----
Tennessee	less	less	Kansas	more	more
North Carolina	same	same	Montana	less	less
South Carolina	less	less	New Mexico	more	same
Georgia	more	more	Idaho	less	less
Alabama	more	more	Washington	more	more
Arkansas	less	same	Oregon	more	more
Ohio	more	less	California	same	same
Indiana	more	more			

Blight was reported on all parts of the tree except the roots. The severest losses occasioned this year were apparently in the form of blossom and twig blights. Although in some states severe blight cankers resulted and in Minnesota entire trees were killed, the disease caused the most immediate injury in the form of blossom blight which prevented the setting of fruit. It is apparent that unusually heavy twig infection in 1925 in conjunction with favorable weather conditions in 1926 will result in a very severe loss next year if weather conditions are favorable.

The losses from fireblight for 1925 were very heavy throughout the country. In certain states, particularly Minnesota, New York, and Michigan, it was nearly as important as scab.

Table 55. Estimated losses from blight as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
8	Michigan, Kentucky	1	South Carolina, Arkansas, Washington, Oregon
7	New York	.25	Connecticut
5	Minnesota, Iowa, Kansas, Mississippi	trace	Maine, New Hampshire, Vermont, Rhode Island, New Jersey, Delaware, Virginia, West Virginia, Georgia, Idaho, Montana, Wyoming, Colorado
4	Maryland, Wisconsin		
3	North Carolina, South Dakota, New Mexico		
2.5	Alabama		
2	Indiana, Illinois, Ohio, Texas		

The record of the first appearance of blight in the various states in 1925 is as follows:

March	Auburn	Alabama	May 19	Westminster	South Carolina
April 10	Knoxville	Tennessee	May 25	Nassau	Delaware
April 20	Anna	Illinois	May 28	Mower County	Minnesota
May 4	Columbia	Missouri	June	Habersham	Georgia
May 8	Lincoln	Nebraska	June 2	Shiloh	New Jersey
May 10	Winchester	Virginia	June 23	Unionville	Connecticut
May 11	Genesee	New York			

Control

Wisconsin: Door County fruit growers have organized a campaign to eradicate the blight by severe pruning in badly blighted orchards near Fish Creek to protect the large holdings at Sturgeon Bay. (Vaughan

Barnett (1) reports the results of treatment in a Jonathan orchard heavily infected with fireblight. The infected parts of the trees were excised and the wounds disinfected with Reimer's combination of cyanide and bichloride of mercury followed by the application of a mixture composed of one part water in three parts waterglass. Only 21 out of 573 wounds thus treated showed evidence of active infection when inspected. The article emphasizes the importance of eliminating hold-over cankers, planting resistant varieties, retarding the rate of twig growth, and controlling insect pests, particularly aphids.

An outstanding contribution to our knowledge of the cytology and overwintering habits of Bacillus amylovorus resulted from the investigation of Nixon (2). An abstract of his paper presented at the Kansas City meeting has been printed in Phytopathology.

Recent literature on blight

1. Barnett, R. J. Two seasons' work with fireblight on apples. Proc. Amer. Soc. Hort. Sci. 21: 292-296. 1925.

2. Nixon, E. L. Migration and transformation of Bacillus amylovorus in apple tissue. (Abstract) Phytopath. 16: 77. Jan. 1926.

3. Seal, J. L. Apple blight, question and answer exercise. Minn. Hort. 53: 172-174. June 1925.

4. Talbert, T. J. Fireblight of apples and pears. Missouri Agr. Exp. Sta. Circ. 137: 1-8. July 1925.

BLISTER CANKER CAUSED BY NUMMULARIA DISCRETA (SCHW.) TUL.

The nature of this disease is such that wide variations in its prevalence cannot be expected. Blister canker in the United States may be said to be a typical Ben Davis disease, particularly in old orchards, since very few of the other important commercial varieties seem to suffer from it. It is a well-known fact that in years of extreme drouth severely cankered trees

will show greater evidence of injury and the rate of killing of severely infected trees will be greater than in years of average moisture. This fact was very noticeable this year in Virginia, according to Fromme who reports on this disease, "Unusually noticeable because of dry season."

Nothing new can be added to the general data on this disease as reported in previous supplements. Compared to last year the prevalence was practically the same. Of the eleven states reporting on this disease, ten reported the same prevalence as 1924 and one other reported less. Only Virginia, Illinois, Kansas, and Tennessee reported blister canker to be important in 1925.

<u>Delaware</u>: Generally prevalent in neglected trees. No noticeable increase observed. (Adams)

<u>Tennessee</u>: Important in neglected orchards. Observed only in eastern Tennessee. (Peacock)

<u>Oklahoma</u>: A very common parasite in many of the orchards of the state. (Rolfs)

<u>Arkansas</u>: Becoming less important as susceptible varieties like Ben Davis are being eliminated. Better care of orchards also effective. (Dept. Plant Path.)

<u>Illinois</u>: Worse on Ben Davis, especially in the western portion of the state where Ben Davis is the main crop. (Anderson & Tehon)

<u>Kansas</u>: Important. Ben Davis seems to be most susceptible. Important disease on account of killing older plantings. (White)

<u>Losses</u>

Only five states reported losses, among them New York, Maryland, Tennessee, and Virginia reported a trace, while Illinois reported 1 per cent. No information was received relative to control measures.

FRUIT SPOT CAUSED BY PHOMA POMI PASS.

Fruit spot was negligible in importance in the United States this year. Only seven states reported on its relative prevalence while eleven simply reported it to be present. During the past five years this disease has been of considerable importance in certain states. In favorable years it is one of the important diseases of apples in the Hudson Valley, but this year no reports were received from New York.

From the limited data available for 1925 we conclude that fruit spot was unusually late in appearance. According to Martin of New Jersey, "In most cases the disease did not appear until after harvest. This disease was not severe if the apples were placed in storage." From Delaware, which has for several years reported considerable loss, only a trace was reported for this year on the late crop. According to Young of Arkansas, "Less than usual at this time. Dry spring apparently unfavorable." Michigan reports it to be of

"minor importance." Vaughan of Wisconsin states, "None seen or reported." According to the Department of Plant Pathology (Washington), "Not reported but known to occur in the central and eastern Washington apple section."

Delaware, Maryland, and West Virginia reported a trace of loss, while in Ohio and New Jersey .5 and .25 per cent respectively was estimated.

BITTER PIT, NON-PARASITIC

Bitter pit is one of the few diseases reported in 1925 to be of greater prevalence than in 1924 or in the average year. Fourteen states reported on this disease, eight of which reported more than in 1924, five the same, and only one less. The states reporting more were New Hampshire, New York, Indiana, Michigan, Idaho, California, and New Jersey. Those reporting the same prevalence as last year were Connecticut, Maryland, West Virginia, Ohio, and Minnesota. Only Kentucky reported less.

Serious losses were reported from Ohio, Indiana, Virginia, Michigan, and California. In the last mentioned state, the entire crop was ruined in some orchards. Only three states reported data on losses. These were Virginia, 5 per cent; Maryland, .5 per cent; and West Virginia, 1 per cent. The following dates of first appearance of bitter pit were received.

Dates and location of earliest reported appearance of bitter pit, 1925

August 8	Wilton	New Hampshire	September 21	Wallingford	Connecticut
August 20	Saugatuck	Michigan	September 27	St. Paul	Minnesota
September 1	Gatlinburg	Tennessee	September 30	Orange Co.	Indiana
September 5	Winchester	Virginia	October 6	Flemington	New Jersey

Only four states reported on varietal susceptibility to bitter pit. In Virginia this disease is most important on Yorks. It also affects Ben Davis and Delicious. In Indiana it was serious this year on Stayman and Delicious. Michigan reports bitter pit on Baldwin.

It is usually assumed in the literature on the subject of bitter pit that the sunken spots and the laying down of the corky tissue is the result of an improperly balanced water supply. Various theories have been advanced to explain the development of this disease. In view of the comparatively heavy prevalence in 1925 it seems reasonable to assume that the abnormally deficient rainfall in the states reporting the heaviest losses from this disease is the important factor.

Virginia: The unusually large York fruit in the upper Valley of Virginia were particularly subject to bitter pit injury in 1925. York is the most important commercial variety in this section and by far the most susceptible to bitter pit injury. Seasonal conditions in this state were such as to cause an unusual early sizing up of fruit. A large percentage of Yorks were of normal size on September 1 but considerable growth took place after that date. The largest sized fruit produced in four years was the result. (Schneiderhan)

APPLE - Jonathan spot; Crowngall

JONATHAN SPOT, CAUSE UNDETERMINED

This disease was slightly more prevalent this year than last. Although it is not a serious factor resulting in large general losses it is important locally. Idaho, which produced the third largest crop in the United States in 1925, reported more Jonathan spot than in 1924 and also more than normal. None of the states reporting indicated that this trouble was of great importance in 1925. Iowa reports that it was a serious factor in stored fruit. In Tennessee Baskin stated that it occurred only in storage. In Minnesota, according to the Division of Plant Pathology, it was in a few orchards of Wealthys only. Hungerford of Idaho reports that it was more important than usual and appeared earlier

CROWNGALL CAUSED BY BACTERIUM TUMEFACIENS EFS. & TOWN.

From the reports of collaborators in 1925 we infer that crowngall prevalence in the United States this year was about the same as last year and as in normal years. Kansas reports 25 per cent of nursery stock infected by this disease in the Kaw Valley. As in previous years it was reported chiefly from those states in which the nursery business is important. A few quotations from various collaborators follow:

<u>Tennessee</u>: On one-year old trees 15 to 20 percent, on two-year old trees 60 to 70 per cent. (Fackler)

<u>Arkansas</u>: Nursery losses great. Not certain how much of this is true crowngall. (Dept. Plant Path.)

<u>Wisconsin</u>: Dr. A. J. Riker who has inspected the largest Wisconsin nurseries reports more of the bacterial gall than usual with much less of the excess callus or root knot. (Vaughan)

<u>Minnesota</u>: Found where the apples are grown; mostly in the lower two-thirds of the state. (Dept. Plant Path.)

<u>Crowngall surveys</u>

During the fall of 1925 A. J. Riker of Wisconsin and J. H. Muncie of Iowa made surveys of nurseries to ascertain the amounts of excess callus, true bacterial gall, hairy root, and gall and root knot found on nursery stock.

The general notes of Riker's survey prepared from nursery inspections in Michigan, New York, Connecticut, Pennsylvania, Maryland, West Virginia, Ohio, and Indiana and submitted to the Plant Disease Survey is as follows:

1. "Bacterial gall was widely distributed but was present on only a very small percentage of the trees examined except at one nursery in Michigan.

2. "Much less excess callus was found on apple where budding was practiced in contrast with places where grafting was done, except in three nurseries where unusual care was taken to make well-fitted grafts.

3. "In general the amount of root knot on apple in the northeast where the practice of budding predominates is much less than in the middle west where grafting predominates.

4. "Grafting of apple trees has been largely discontinued in the northeast because of the larger amount of root knots and less well-developed root systems which develop on grafted stock.

5. "Bacterial gall was found widely distributed on peach, but with the exception of one nursery was present on only a very small percentage of the trees examined."

Muncie's inspections were made in Iowa, Kansas, Missouri, Indiana, New York, Virginia, Tennessee, and Alabama. The summary of his observations follows:

1. "True crowngall was as widespread in the eastern and southern states visited as in the central western states.

2. "With the exception of one nursery, non-pathogenic knots at the union of grafted trees was also as widespread and as frequently found as in the middle western nurseries.

3. "Budding is more generally practiced in the eastern states and this reduces losses due to callus knots on apple.

4. "True crowngall on peach was found in every nursery visited but only in slight amounts.

5. "Hairy root on budded apples was abundant in all nurseries visited but especially so in the southern states. This appeared for the most part to be non-pathogenic. No manifestation of hairy root was seen on peach."

Crowngall investigations

Studies on the relation of crowngall to apple nursery stock have been continued in Iowa and Wisconsin. Riker and Keitt (4) report:

"Isolation studies were made on 227 apple trees, representative of lots of stock submitted as crowngall rejects by 12 nurseries in six states. Less than two per cent of these trees yielded _Bacterium tumefaciens_ Smith and Town. Tests of the isolation technique on known crowngall material gave positive results from 44 to 46 plants. A study of the trees which failed to yield the crowngall organism showed most of the malformations to be associated with poorly fitted grafts. Various types of misfitted grafts were grown experimentally in com-

parison with well-fitted grafts. Malformations could be induced or prevented almost at will by the type of fit. An examination of samples of freshly prepared commercial grafts from eight nurseries showed misfits in sufficient numbers and types to account for all the root knot reported by these nurseries. The following types of misfit appear to lead commonly to the more severe callus overgrowths: cion tip long, cion larger than stock, graft too loosely wrapped. Wrapping grafts with cloth waxed paper, or medical adhesive tape reduced the amount of callus development. The results thus far available give promise that the major portion of the callus overgrowths at the unions of grafted apples may be prevented by modifications in grafting practice."

Muncie (2) says:

"Three distinct types of hairy root have been observed on French apple seedlings, namely: (1) the woolly knot form, arising from a distinct gall; (2) the simple form described by Stewart; (3) the type in which fine fibrous roots arise in clusters from the tap root."

The same writer (3) reports:

"Work has been continued on water donduction in galled and normal piece-root grafted two-year cut-back Wealthy, Jonathan, and Salome apple. The reduction in water flow through galled Wealthy, Salome, and Jonathan trees was 69.7, 21.7, and 47.2 per cent respectively. Lateral roots arising from above or opposite the gall may in some cases counteract the obstruction offered by the gall.

"Young tomato plants were set in soil infested with Bacterium tumefaciens and inoculated by injuring the stem at the surface of the soil and smearing the wound with the infested soil. Typical crowngall resulted up to 102 days after infesting the soil."

According to Sherbakoff (6):

"In a single experiment sulfur applied at the rate of 600 pounds per acre appeared to reduce the number and size of the crowngalls produced on nursery apple trees. The sulfur was applied to alternate rows and thoroughly mixed with soil in the furrow before the grafts were set."

Waite and Siegler (7) have reported on control by chemical treatment of the grafts:

"In the experiments of 1925 the organic mercury treatment was given to 2,169 grafts, representing a number of different varieties with the result that the total number of trees obtained at digging time with both large and small galls amounted to 6.1 per cent, as compared with 32.6 per cent on 2,619 untreated grafts of the same varieties which were used as checks. The proportion of the total number of large galls in the treated grafts of all varieties was 2 per cent and in the untreated or check grafts 28.7 per cent.

"The following treatment of apple grafts for the control of crowngall is recommended as a result of a large number of experiments over a number of years:

"(1) Select seedlings free from hairy-root and crowngall infection.

"(2) After washing, dip for 10 minutes uncut seedling and scions in a solution consisting of one part of hydroxymercurichlorophenol* to 400 parts of water (approximately at the rate of one ounce to three gallons). In this as well as in subsequent dips do not rinse with water, and keep the solution in either a wooden or a nonmetallic container.

"(3) Dip the grafts, which should be well fitted and carefully wrapped, in this same freshly made solution for about five seconds.

"(4) Store grafts under cool conditions and dip grafts for about five seconds in a freshly made solution of the mercury compound immediately before planting.

"(5) Keep the bench on which the grafting is done, as well as all grafting tools, disinfected by frequent washings with a germicide."

*Obtainable on market in powdered form under the trade name "Semesan."

Recent literature on crowngall

1. McClintock, J. A. Progress report on crowngall experiments conducted at the University of Tennessee Experiment Station. Proc. Tennessee State Hort. Soc. 19: 86-88. 1924.

2. Muncie, J. H. Hairy root of apple seedlings. (Abstract) Phytopath. 16: 78. Jan. 1926.

3. ______________ The effect of crowngall on young apple and peach trees and longevity of Bacterium tumefaciens in the soil. (Abstract) Phytopath. 16: 79. Jan. 1926.

4. Riker, A. J., and G. W. Keitt. Studies of crowngall and callus overgrowths on apple grafts. (Abstract) Phytopath. 16: 78. Jan. 1926.

5. ______________________________ Crowngall in relation to nursery stock. Science 62: 184-185. Aug. 21, 1925.

6. Sherbakoff, C. D. Effect of soil treatment with sulfur upon crowngall in nursery apple trees. Phytopath. 15: 105-109. 1925.

7. Waite, M. B., and E. A. Siegler. A method for the control of crowngall in the apple nursery. U. S. Dept. Agr. Cir. 376: 1-8. Jan. 1926.

APPLE - Sooty blotch; Flyspeck; Powdery mildew

SOOTY BLOTCH AND FLYSPECK CAUSED BY GLOEODES POMIGENA (SCHW.) A. S. COLBY AND LEPTOTHYRIUM POMI (MONT. & FR.) SACC.

Only eight states reported on sooty blotch in 1925. This disease although of minor importance in the country as a whole has been known to cause serious losses in certain localities. On certain varieties like York, Stayman, Black Twig, and Ben Davis, it is serious in poorly sprayed orchards in Maryland, West Virginia, and Virginia.

Connecticut reports more sooty blotch than in 1924, Delaware reports less, Virginia more, and Wisconsin the same as 1924. No state reported more than normal prevalence in 1925.

The following statements describe the disease status in certain states:

Connecticut: More than average year with prominence gained toward end of season on light skinned varieties. (Clinton)

Virginia: General and important in poorly sprayed orchards. A common cause of culls. (Schneiderhan)

Indiana: Serious in unsprayed orchards. Worst on light colored varieties such as Grimes and Northwestern Greening. (Gardner)

Michigan: About as usual, found mostly on Talman Sweet (Tollman) variety in unsprayed orchards. (Vaughan)

Minnesota: Considerable blotch developed in the Albert Lea section. It was present on all varieties, but most conspicuous on Greenings. (Sect. Plant Path.)

Dates of earliest reported appearance were reported as follows:

August 19	Wyoming	Delaware
September 10	Winchester	Virginia
September 22	Milford	Connecticut

Recent literature

1. Kendall, J. C. Sooty mould. (Data from work conducted by O. R. Butler). In New Hampshire Agr. Exp. Sta. Bul. 216 (Rept. of Director 1924): 14-15. 1925.

POWDERY MILDEW CAUSED BY PODOSPHAERA LEUCOTRICHA (ELL. & EV.) SALM.

Although this disease is of minor importance in the United States it has been known to cause serious losses on certain varieties. The Jonathan seems to be particularly susceptible to powdery mildew infection and this variety has been known to be severely injured as a result of twig growth following the killing of terminal leaves. Twelve states reported on powdery mildew in 1925. In regard to the prevalence of this disease compared both with 1924 and with

normal, three states, Delaware, Indiana, and California, reported greater prevalence; three, Connecticut, New York, and Oregon, reported less; while Maryland, Virginia, West Virginia, Michigan, Wisconsin, and New Mexico reported the same prevalence.

Powdery mildew is an early season disease as will be indicated by the dates of first appearance.

Dates and location of earliest reported appearance of powdery mildew, 1925

May 1	Winchester	Virginia	June 4	Mt. Holly	New Jersey
May 7	Yalesville	Connecticut	July 23	Hennepin County	Minnesota
May 18	Dutchess County	New York	September 28	Gibson County	Indiana
May 22	Bridgeville	Delaware			

Notes from collaborators

New Jersey: Powdery mildew was found in abundance on Rome Beauty in Burlington County. (Martin)

Delaware: More general than usual. Common on Stayman, Rome Beauty, and Transparent. (Adams)

Virginia: First observed May 1 at Crozet and caused some local injury there and at Winchester; especially on Jonathan and Stayman. (Fromme)

Tennessee: Fairly important. Causes leaf and twig defoliation. Confined to Rome Beauty and Jonathan. (Baskin)

Minnesota: Causes partial defoliation in nurseries. Chiefly found on young trees in nurseries. (Dept. Plant Path.)

ROOTROTS

Black rootrot caused by Xylaria spp.

It is very probable that black rootrot is more prevalent than the usual estimates would seem to indicate. It is particularly prevalent in the southern states where it sometimes causes severe losses in old orchards. The following reports throw some light on the status of this disease in 1925.

Virginia: Percentage of tree death greater than in normal years. The dry season evidently caused many trees to die during the year which would ordinarily have survived for another year or so with normal rainfall. (Fromme & Schneiderhan)

Kentucky: Very important; widely distributed. Perhaps 1 per cent of trees dying per year. (Magill & Valleau)

Tennessee: More Xylaria than last year. Trees die while leaves and fruit remain. Found on Ben Davis and Grimes. (Baskin)

Mushroom rootrot caused by Armillaria mellea (Vahl) Quel.

This is another minor disease of apples. Only two states reported losses in 1925 and these were New York and West Virginia, both reporting a trace. Sixteen states prepared a report on this disease and of these thirteen reported it to be unknown in the state.

Other rootrots

Ozonium omnivorum Shear was reported by Taubenhaus as "Very important in the black lands of Texas, where apples cannot be grown on account of it."

Undetermined rootrots of various types were reported from several states.

FROST INJURY

From the data submitted by the collaborators, shown in the accompanying table, frost injury in certain states was by far the largest factor causing loss to apple production this year.

Table 56. Estimated losses from frost injury as reported by collaborators, 1925.

Percentage loss	State reporting
80	South Dakota
50	Iowa
40	Virginia
25	West Virginia, Maryland, Minnesota
20	Ohio
10	Michigan

Delaware: Frequent frosts occurred during April. Blossoming varieties hurt mostly. (Adams)

Virginia: Frosts on April 21 with a temperature of 28 degrees were general in the Valley of Virginia and caused a loss of 40 per cent. The blossoms were killed, leaves severely injured, and the fruit showed a high percentage of russeting and frost rings. (Schneiderhan)

Indiana: Frost May 25 was very serious. Worst russet and lopsidedness of Ben Davis resulted in southern Indiana. (Gardner)

Illinois: General frost May 23 and 24 caused serious losses in all sections of the state and deformed apples were common due to the advanced stage of the fruit. It was not generally killed outright. (Anderson)

Minnesota: Frost tended to thin amount of fruit on trees, but did not cut down crop as much as at first supposed. (Div. Plant Path.)

HAIL INJURY

Severe losses were reported as a result of hail injury in Connecticut, West Virginia, Virginia, Minnesota, and Iowa. From Virginia, Schneiderhan reports the following:

"Hail losses throughout Virginia have been so severe locally during the past four years that all insurance companies have been doing business at considerable loss. The result has been the rapid increase of premiums for this type of insurance. The largest single hail loss on apples ever adjusted in the United States occurred in an orchard near Mt. Jackson, Virginia. This orchard was insured for $67,000, and as a result of an 80 per cent adjustment the insurance company paid to the owner $53,187.85."

OTHER DISEASES AND INJURIES

There are very many miscellaneous diseases and injuries of apples of considerable importance locally but unimportant from a country-wide standpoint. It is manifestly impossible to go into a detailed description of some of these diseases in a summary of this kind, therefore, we shall give brief quotations from collaborators concerning them and give a list of the recent literature dealing with them.

Alternaria sp., blossom-end rot - New Jersey.

Botrytis sp., fruit rot - Washington.

Cephalothecium roseum Cda., pink rot - New York.

Cercospora mali Ell. & Ev., leafspot - Texas.

Coniothyrium sp. - reported from Washington.

Gloeosporium perennans Zeller & Childs, perennial canker.

For some years difficulty has been encountered in controlling what was thought to be Neofabraea malicorticis in certain orchards in the Hood River Valley, Oregon. It has now been ascertained that at least one of the reasons for this is that there are the two distinct but similar forms. One is the common Neofabraea and the other a new fungus (Gloeosporium perennans Zeller & Childs.) For the disease caused by the latter Zeller and Childs (50) have proposed the name perennial canker.

The known distribution of the disease ranges from the Okanogan Valley, British Columbia, to the Willamette Valley, Oregon. It has also been reported from the Spokane and Wenatchee Valleys in Washington, and from certain stations along both sides of the Columbia River and especially the Hood River Valley where it has spread rapidly. It causes serious damage in some localities.

Neofabraea malicorticis (Cordley) Jack., anthracnose - Washington and Oregon. According to Zeller (Oregon), growers spray to control it, so there is comparatively little loss in the better commercial orchards.

APPLE - Other diseases

Nectria galligena Bres., European canker - New York, Maryland, Washington, and Oregon. It was of no great economic importance anywhere.

Penicillium expansum, rot - causing loss in transit, Texas.

Phytophthora cactorum (Leb. & Cohn) Schroet., rot - New York and Indiana. According to Gardner (Indiana), "It is rather serious locally. High rainfall favorable. Noted first on drops under trees, later in the packing sheds."

Valsa leucostoma (Pers.) Fr., dieback - Missouri.

Volutella fructi Stevens & Hall, rot - West Virginia.

Measles (undet.) reported from New Mexico and West Virginia. According to Leonian, (West Virginia), measles were found in two orchards and were confined to Delicious trees. The disease apparently spread very slowly in these orchards, as in the last four years it has advanced not more than one row of trees. Each infected tree forms a center of infection so that spots of measled trees were found throughout that part of the orchard where the Delicious trees were planted. Infected trees are stunted, branches die back in severe cases and in the course of a few years the trees become worthless. The symptoms do not appear during the growing season but they manifest themselves in the late fall and winter. Apparently severe pruning of infected wood checks the disease. According to Crawford (New Mexico), "Measles occur all over the state where Jonathan are grown. Most severe on alkaline soil."

Mosaic (chlorosis) - was reported on Baldwins in New York.

Rosette (non-par.) - Idaho.

A new disease resembling scald was observed in packing houses in several of the Northwestern apple districts during the past season. Apparently this trouble was found only on apples which had remained for sometime unwrapped in contact with some of the veneered tops and bottoms which were introduced for use in making apple boxes this season. Only that portion of the surface of the apple which had apparently been in contact with the wood was affected.

Leroy Childs, Superintendent of the Hood River Experiment Station, states that he and Gordon G. Brown, Station Horticulturist, are making observations concerning this new apple affliction. They have accumulated a number of common woods employed for box-making purposes, and have placed apples thereon to determine the effect. Owing to the fact that much confusion exists among lumbermen, relative to the specific names of the various woods involved, they have sent samples of all the wood received to Stanford University, for the purpose of getting a determination of each species of wood tested, so that they may accurately determine such woods as may cause injury. Mr. Childs states that they have obtained injury on wood that has been called Yellow Fir, Oregon Pine, and a material just labelled Fir, all of which he believes are Douglas Fir. (Robb, F. G. In U. S. Dept. Agr. Bur. Agr. Econ. Fruit & Veg. Div. Letter 6: 138. Mar. 27, 1925.)

Internal breakdown (non-par.) - Minnesota, Washington, and Idaho. In Idaho, according to Hungerford, it was especially bad on Rome Beauty, Winesap, and Jonathan.

Spot necrosis (non-par.) - reported from three counties in Washington.

Incompatibility of black walnut and apple trees - Schneiderhan (36) of Virginia reported the death of apple trees in the proximity of a black walnut tree. The area of toxicity coincided with the area of development of black walnut roots.

Winter injury - Oklahoma, Washington, Montana, and Oregon. According to Barss of Oregon it was important this year, being severe in the Willamette and Hood River Valleys, and worse on old than on young trees in the latter section.

Spray injury - New Jersey, Washington, Connecticut, Delaware, Indiana, and Virginia. In New Jersey severe leaf injury followed the use of 4-5-50 Bordeaux. In another orchard where sulfur-lead-lime dust was used there was a severe burning of the center of the leaf. In the orchards sprayed with dry-mix sulfur-lime, brown circular areas resembling frog-eye were observed. In Indiana Bordeaux caused russet on Ben Davis, sulfur sunburn was noted on Rome and Kinnard and sulfur dust injury occurred in the experimental orchard at Lafayette.

In Virginia Schneiderhan (36) reported experiments on the results of using lime-sulfur alone and in combination with lead arsenate and calcium caseinate; Bordeaux mixture 3-4-50; lead arsenate; copper hydrate; and dry-mix sulfur lime. Spraying these materials at a temperature of 51° F., resulted in severe russeting by Bordeaux mixture and copper hydrate but no injury from the other materials. However, applying at 94° F. resulted in severe injury from the lime-sulfur combinations and no injury from Bordeaux, copper hydrate, lead arsenate and dry-mix. The maximum injury following Bordeaux occurred 20 days after application, while the maximum injury following lime-sulfur was noted five days after. The use of calcium caseinatein combination with lime-sulfur and lead-arsenate reduced spray injury 20 per cent.

Drouth injury - reported from five states. In a certain part of Texas, according to Taubenhaus, it caused a loss of 50 per cent. In Arkansas, many trees were killed or weakened by dry weather according to Young.

Sunscald (non-par.) - Delaware, New York, Arkansas. According to Adams of Delaware, "Sunscald became very prevalent on fruit the first week in June. Early Ripe, Transparent, Dutchess, and York Imperial showed greater injury than previously observed."

Disease surveys

The only apple disease survey reported this year was by Hurt of Virginia, (table 57).

Table 57. Apple diseases and other injuries found on Pippin, Winesap, York, Stayman, and Ben Davis in 32 orchards, Crozet, Virginia, 1925.

Disease	Per cent infected orchards	Maximum percentage of infection	Average percentage of infection
Scab	25.0	25.0	.15
Cedar rust	12.5	.15	trace
Bitter rot	9.4	14.	trace
Blotch	6.2	2.0	.09
Black rot	34.4	1.0	.2
Flyspeck	trace	trace	trace
Russet	6.2	11.3	.39
Sooty blotch	6.2	trace	trace
Fireblight	0	0	0
Bitter pit	31.2	50.	.62
Water core	0	0	0
Spray burn	37.5	11.3	.58

APPLE - Miscellaneous literature

Recent literature on miscellaneous apple diseases, apple spraying, etc.

1. Anon. Apple transport problems. Investigations by a scientific expedition from the food investigation board. South Africa Fruit Grow. 12: 269-271. Aug. 1925.

2. Anon. Experiments on keeping apples in oiled wrappers. Jour. Min. Agr. Great Britain 32: 626-629. Oct. 1925.

3. Anon. Tratamiento eficaz para combatir la 'fumagina' de la Manzana 'Cara Sucia'. (Control of flyspeck of the 'Cara Sucia' apple Min. Agr. Nac. (Buenos Aires) Secc. Prop. e Inform. Circ. 468: 1-7. 1925.

4. Baker, C. E. How oiled wraps prevent scald on apples. Better Fruit 20 (20): 11-12. Aug. 1925.

5. Bhosalé, Y. P. Low temperature and root injury of the apple. Amer. Fruit Grower 45 (4): 12. 1925.

6. Birmingham, W. A. An uncommon watercore condition in apples. Agr. Gaz. New South Wales 36: 59-62. Jan. 1925.

7. Blake, M. A. Apples are injured by severe drought. Marked difference in varietal resistance. New Jersey State Hort. Soc. News 6: 132. Nov. 1925.

8. Briton-Jones, H. R. On the diseases known as 'bark canker' and 'die back' in fruit trees. Jour. Pomol. & Hort. Science 4: 162-183. 1925.

9. Brooks, F. T. Polyporus adustus (Willd.) Fr. as a wound parasite of apple trees. Trans. British Mycol. Soc. 10: 225-226. 1925.

10. Brown, E. Apple leaf scorch. Gard. Chron. III, 77: 440. June 1925.

11. Brown, W. A study of forms of Fusarium occurring on the apple fruit. Rep. Proc. Imp. Bot. Conf. London 1924: 339-346. 1925.

12. Carne, W. M. Cracking and russeting of Dunn's and other apples. Jour. Dept. Agr. Western Australia II, 2: 214. June 1925.

13. Carrick, D. B., and J. Oskamp. Storage scald of apples. Cornell Univ. Coll. Agr. Ext. Serv. Bul. 128: 1-10. Sept. 1925.

14. Dillon Weston, W. A. R. A preliminary note on the perithecia of Nectria galligena. Ann. Appl. Biol. 12: 398. 1925.

15. Doran, W. L. Experiments on the control of apple scab and black rot and spray injury in 1924. Massachusetts Agr. Exp. Sta. Bul. 222: 10 pp. unnumbered. 1925.

APPLE - Miscellaneous Literature

16. Durham, H. E. Apple leaf scorch. Gard. Chron. III, 77: 372-373. May 30, 1925.

17. ____________ Apple leaf scorch. Gard. Chron. III, 78: 34. July 11, 1925.

18. Eriksson, J. Phytopathologische Mitteilungen I. Ark. Bot. 19 (6): 1-29. Apr. 1925. Fusarium wilkommi.

19. Fenner, E. Aline. A rot of apples caused by Botryosphaeria ribis. Phytopath. 15: 230-234. 1925.

20. Fulmer, H. L. The new spray materials. Canad. Hort. 48: 27-28; 46-48. Feb. 1925.

21. Hatton, R. G., and N. H. Grubb. Field observations on the incidence of leaf scorch upon the apples. Jour. Pomol. & Hort. Sci. 4: 65-77. Jan. 1925.

22. Hedrick, U. P. Winter injury of fruit trees. Amer. Fruit Grow. Mag. 45 (4): 3, 39. Apr. 1925.

23. Hooker, H. D. Copper hydroxide as a substitute for bordeaux. Proc. Amer. Soc. Hort. Sci. 21: 173-176. 1925.

24. Horne, A. S. Fungal diseases of stored apples. Rep. Proc. Imp. Bot. Conf. London 1924: 363-372. 1925.

25. Howitt, J. E. Crown or collar rot. Farm. Advocate 60: 553. Apr. 9, 1925.

26. Kidd, M. N., and A. Beaumont. An experimental study of the fungal invasion of apples in storage with particular reference to invasion through the lenticels. Mem. Food Invest. Bd. Great Britain 60: 14-33. 1925. Reprinted from Ann. Appl. Biol. Feb. 1925.

27. Lang, J. H. The development of "scald" in cold stored apples. Fruit World Australasia 26: 62-63. Feb. 1925.

28. McClelland, N., and L. W. Tiller. Flesh collapse in apples, season 1924. Influence of variety, maturity and cold storage conditions. Fruit World Australasia 26: 259-262. July 1, 1925.

29. Morse, W. J., and D. Folsom. Apple spraying and dusting experiments 1918 to 1924. Maine Agr. Exp. Sta. Bul. 325: 126-184. July 1925.

30. Motz, F. A., F. J. Schneiderhan, and W. J. Schoene. Spray information for Virginia fruit growers. Virginia Agr. & Mech. Coll. & Poly. Inst. Ext. Div. Bul. 94: 1-21. Jan. 1925.

31. Potter, G. F. Winter injury to apple roots. Fruit Belt 23 (11): 23, 25. Nov. 1925.

APPLE - Miscellaneous Literature

32. Ramsey, G. B., and L. F. Butler. Ammonia injury of fruits and vegetables in storage. (Abstract) Phytopath. 16: 73. Jan. 1925.

33. Rhoads, A. S. Apple measles. Amer. Fruit Grow. Mag. 45 (1): 11-12. Jan. 1925.

34. Rose, D. H., and C. C. Lindegren. Phytophthora rot of pears and apples. Jour. Agr. Res. 30: 463-468. Mar. 1, 1925.

35. Ruth, W. A. Prevention of apple scald with oiled papers. Trans. Illinois State Hort. Soc. 58 (1924): 229-232. 1925.

36. Schneiderhan, F. J. Apple disease studies in northern Virginia. Virginia Agr. Exp. Sta. Bul. 245: 1-35. Feb. 1926.

37. Shear, C. L., N. E. Stevens, and M. S. Wilcox. Botryosphaeria and Physalospora in the eastern United States. Mycologia 17: 98-107. May-June 1925.

38. Smith, A. J. Brown heart in Australian apple shipments. Spec. Rep. Food Invest. Bd. Great Britain 22: 28 pp. 1925.

39. Smith, H. V. Cold storage experiments. Oiled wrappers prevent scald in Granny Smith apples at Batlow, New South Wales. Fruit World Australasia 26: 107. Mar. 1925.

40. Swartwout, H. G. Treatment of apple canker diseases. Missouri Agr. Sta. Bul. 228 (Ann. Rept. Director 1923-24): 59. 1925.

41. Swingle, C. F. Stem-borne rudimentary roots of apple - frequently confused with crowngall. U. S. Dept. Agr. Off. Rec. 4 (30): 5. July 29, 1925.

42. ______________ Burr-knot of apple trees - its relation to crowngall and to vegetative propagation. Jour. Heredity 16: 312-320. 1925.

43. Thomas, H. E. Root and crown rot of apple. Proc. New York State Hort. Soc. 70: 171. 1925.

44. Thomas, P. H. Re-grafting apple trees. The fungus disease Polystictus versicolor is often troublesome. Some helpful suggestions. Fruit World Australasia 26: 66. Feb. 1925.

45. Togashi, K. Some studies on a Japanese apple canker and its causal fungus, Valsa mali. Jour. Coll. Agr. Hokkaido Imp. Univ. Sappore, Japan 12: 265-324. Dec. 1924.

46. Van Poeteren, N. Verslag over de Werkzaamheden van den Plantenziektenkundigen Dienst in het jarr 1924. (Report of the activities of the Phytopathological Service in the year 1924). Versl. en Meded Plantenziektenkundigen Dienst de Wageningen 41: 62. 1925.

Star apple trees at Bengen were defoliated by a leafspot which bore immature fruiting bodies resembling pycnidia of Phyllosticta mali.

47. Wallace, T. Apple leaf scorch. Gard. Chron. III, 62: 455-456. June 27, 1925.

48. Whetzel, H. H. The future of dusting. Trans. Penin. Hort. Soc. 38 (1924): 26-33. 1925.

49. Young, H. C., and R. C. Walton. Spray injury to apple. Phytopath. 15: 405-415. July 1925.

50. Zeller, S. M., and L. R. Childs. Perennial canker of apple trees. (A preliminary report.) Oregon Agr. Exp. Sta. Bul. 217: 1-17. Aug. 1925.

PEAR

The total production of pears in the United States in 1925 was 19,820,000 bushels compared to 18,868,000 bushels in 1924. The total value of the 1925 crop was $27,944,000.00 while that of 1924 was $26,693,000.00. In order of their production, the states ranked as follows in 1925: California, New York, Washington, Oregon, and New Jersey. The state of California produced more than twice as many pears as any other state.

BLIGHT CAUSED BY BACILLUS AMYLOVORUS (BURR.) TREV.

Blight is co-extensive with pear culture and for a long period of years it has been the most serious disease of this fruit in the United States. Weather conditions in 1925 appear to have been particularly favorable for development and spread of the causal organism on apples and pears. Blight was considerably more prevalent in 1925 than in 1924. Of the 26 states reporting, the disease was more prevalent in 11, the same in 10, and less in 5 states. Those reporting more were New York, Delaware, Alabama, Indiana, Illinois, Wisconsin, Iowa, Nebraska, Kansas, Oregon, and California. Compared to normal prevalence, 8 states reported more, 6 less, and 7 the same. The 8 states reporting more than normal prevalence were Alabama, Illinois, Wisconsin, Kansas, Oregon, California, and Kentucky.

The following figures indicate such losses as were reported by the various states:

PEAR - Blight

Table 58. Estimated losses from pear blight as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
25	Georgia, Alabama	4	Kansas
20	New York	3	Ohio
18	North Carolina	2	Texas
16	California	1.5	Delaware
15	Kentucky	1	Virginia
10	South Carolina, Iowa, Michigan, Illinois	.5	Connecticut
8	Maryland	trace	West Virginia, Maine, New Jersey, Wisconsin, Idaho

<u>Dates and location of earliest reported appearance of blight, 1925</u>

April 24	Urbana	Illinois	June 4	New Brunswick	New Jersey
April 25	Raleigh	North Carolina	June 10	Seaford	Delaware
May 1	Portsmouth	Virginia	July 10	Seabrook	New Hampshire
May 8	Lincoln	Nebraska	July 24	Hadlyme	Connecticut
May 19	Clemson College	South Carolina	August 19	Milwaukee	Wisconsin
May 21	Ulster County	New York			

We have the following reports from collaborators:

<u>New York</u> (Ontario County): Fireblight has taken an exceptionally heavy toll this year, wiping out quite a few pear orchards. (Burrell) (Yates County) - Mixed pear orchard including the Seckel pear practically ruined for this year. (Raymond)

<u>Delaware</u>: First observed June 10. Has developed more rapidly and general distribution is greater than on apple. Slight increase over last year. (Adams)

<u>Georgia</u>: Vigorous blossom and shoot blight in the spring. Only slow development after first week in April due to drouth of April and May. Renewed activity beginning the tenth of June in twig blight and canker forms. Fruit rot common but not severe. (Boyd)

<u>Mississippi</u>: Serious blossom blight in many localities; 15 and 20 per cent loss. (Neal)

<u>Oklahoma</u>: Not so destructive as last year on the pear. Quite plentiful on some varieties of apple. (Rolfs)

<u>Ohio</u>: Very destructive throughout Ohio this year. (Young)

<u>Missouri</u>: Particularly severe this past season. (Bregger)

PEAR - Blight

Nebraska: Much more prevalent and serious than last year. (Peltier)

Kansas: Unusually severe as blossom and twig blight this spring. Numerous reports from all over the state, especially the northeastern section and Arkansas Valley section, reported the disease as being present in practically 100 per cent of the orchards, especially the older ones where it was doing its worst damage. This year's crop was decidedly reduced due to blossom blight and next year's crop is handicapped already due to twig and spur blight. (White)

Washington: Excessive damage along the Snake and in the Yakima Valleys. It has been prevalent in the Walla Walla section on apples and pears but doing most damage to the latter. (Dept. Plant Path.)

Oregon: In the Milton-Freewater district practically all trees were affected according to R. F. Wilbur, fruit inspector. In Jackson County it has been reported more severe than for several years causing heavy loss. Of no consequence in the Hood River Valley. (Barss)

California: Disease so bad in some regions that thrifty eight-year old orchards were almost ruined. Some orchards didn't produce a crop. Disease occurred in foot-hill sections where it is not of usual occurrence. (Milbrath)

The important work of Nixon (2) showing transformation and migration of Bacillus amylovorus in the holdover cankers has already been mentioned under apple.

In California, according to Heppner (1), the demand for Japanese pear stocks has decreased considerably in favor of French stock. The change is traceable directly to pear blight.

According to Waite (3):

"Pear blight occasionally attacks the fruit of summer apples up to maturity but has never been found on mature winter apples or pears at harvest time or during winter storage, and under ordinary inoculation conditions the organism will not attack such fruit. The author shows, however, that under damp chamber conditions Bacillus amylovorus can attack the tissues of mature, winter apples, and also rose cuttings. Roses have never been found attacked by pear blight out of doors." (F. V. R. Bot. Abstr.)

Recent literature on pear blight (see also apple blight)

1. Heppner, M. J. Recent root stock developments. Amer. Fruit Grow. 45 (3): 10, 50. 1925.

2. Nixon, E. L. Migration and transformation of Bacillus amylovorus in apple tissue. Phytopath. 16: 77. 1926.

3. Waite, M. B. Pear blight infection of rose cuttings and of mature fruit. Official Rec. U. S. Dept. Agr. 4: p. 5. Aug. 1925.

SCAB CAUSED BY VENTURIA PYRINA ADERH.

Compared with normal, and 1924 prevalence, pear scab was less important in 1925. Thirteen states reported it and among them, 4 reported more than in 1924, 6 less, and 3 the same. Those reporting more were New York, Oregon, California, and New Jersey. Only nine collaborators compared the 1925 prevalence with normal. Of these, one state, Oregon, reported more than normal, 5 less, and 3 the same.

It is quite apparent that the heaviest losses in the country occurred in California, Michigan, and Oregon.

Table 59. Estimated losses from pear scab as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
4	California	.5	New Jersey
2	Michigan	trace	New York, Virginia, Maine, West Virginia, Georgia, Wisconsin, Iowa, Kentucky
1.5	Connecticut		
1	Maryland, Alabama, Oregon, Ohio		

<u>Dates and location of earliest reported appearance of scab, 1925</u>

May 4	Dover	Delaware	July 24	Essex	Connecticut
May 15	Winchester	Virginia	August 19	Milwaukee	Wisconsin
June 29	Genesee County	New York	August 28	Middlesex	New Jersey

<u>Delaware</u>: Very slight infection this year. (Adams)

<u>New York</u>: Considerable on Flemish Beauty. (Chupp & Pierstorff)

<u>Virginia</u>: Only one case noted at Winchester on Seckel pears, May 15. (Schneiderhan)

<u>Michigan</u>: There has been very little scab present. Susceptible varieties even when unsprayed showed very small amount. (Bennett)

<u>Oregon</u>: Worse than it has been for several years due to prolonged spring rains and cool weather. (Barss)

Lane County - Very prevalent on most varieties. Loss on Bartletts 10 to 15 per cent; other varieties 15 to 20 per cent. In unsprayed orchards the losses are 75 to 80 per cent. (Stewart)

PEAR - Leafblight; Leafspot; Winter injury

LEAFBLIGHT CAUSED BY FABRAEA MACULATA (LEV.) ATK.

This disease has been particularly destructive in New Jersey, Delaware, and Maryland. It is known to occur wherever pears are grown, but in recent years the most serious losses have been reported from the Middle Atlantic States. This disease also was less prevalent in 1925 than normally or in 1924. No state reported greater prevalence of this disease than for normal, three states reported less, and Maryland, in which the disease seems to be particularly severe, reported the same. Leafblight appeared on May 13 in Delaware, May 10 in Virginia, and July 7 in New Jersey.

Massachusetts: A serious case of this disease on nursery stock was noted in Amherst. (Osmun & Davis)

Delaware: Where copper sprays were used only a trace of infection was found. Neglected trees showing defoliation on July 27, but much less than last year. (Adams)

Florida: Common over the northern section of the state. (Rhoades)

LEAFSPOT CAUSED BY MYCOSPHAERELLA SENTINA (FR.) SCHROET.

The reports on this disease indicate that it was less important this year than usual. From the standpoint of economic importance it ranks as a minor disease. In Virginia it is the commonest disease of pears, but the loss occasioned by it there is minor because pears are not grown extensively.

New York: Serious on neglected trees. (Chupp & Pierstorff)

Virginia: The commonest leaf disease of pears but of no great economic importance. (Schneiderhan)

Georgia: Less prevalent than last year. Probably due to drouth in April and May. (Boyd)

Michigan: Present in nearly all orchards but of no economic importance. (Bennett)

WINTER INJURY

Winter injury seems to have been particularly severe during the winter of 1924 and 1925.

Alabama: Considerable injury caused by trees going into dormancy in poor condition. (Miles & Blain)

PEAR - Winter injury; European canker; Blackrot

Illinois: Pears nearly all killed by low winter temperatures December 26, 27, and 28, 1924. (Anderson & Tehon)

Michigan: In some orchards more than 50 per cent of the fruit will show some form of frost marking. (Bennett)

Minnesota: Pears grown on fruit breeding farm severely injured during the winter. Several trees killed. (Dept. Plant Path.)

Idaho: Severe freeze of December 1924 caused very large amount of injury. (Hungerford)

EUROPEAN CANKER CAUSED BY NECTRIA GALLIGENA BRES.

European canker was reported from Washington and Oregon. In the latter state it was said to be very important and more severe than usual. It occurred in western Oregon including the Hood River Valley. Concerning the disease S. M. Zeller, of Oregon writes as follows:

"Always more serious in seasons following extreme cold, as in 1920 and this year. Thin-barked more susceptible than thick-barked varieties. According to prevalence observed Surprise, D'Anjou, Bosc, Howell, Bartlett most susceptible in order named. Few cases on Winter Nelis and Comice. In one orchard at Corvallis, in 96 trees of Oreille 8-1/3 per cent had trunks cankered, while of 408 trees of Surprise 33 per cent had cankered trunks.

"In 1922 a 3-year old orchard of 140 acres of Surprise near Grants Pass had 42 per cent of the trunks cankered. The disease was cut out according to the following recommendations and has not returned since.

"Control - 1. Where infection extends into the cambium it is cleaned out thoroughly.

"2. Cases of superficial canker are merely scarified.

"3. All cleaned wounds are coated with Bordeaux paste made up in raw linseed oil, using Sherwin-Williams "Fungi-Bordo" dust, stirring the oil into it until a thick paint is formed.

"4. Spray with Bordeaux 4-4-50 before first fall rains, and after leaf fall if possible (a large number of infections take place through fresh leaf scars), to prevent new infections. It is very important to spray before the fall rains."

Recent literature

1. Dillon Weston, W. A. R. A preliminary note on the perithecia of Nectria galligena. Ann. Appl. Biol. 12: 398-400. July 1925.

BLACKROT CAUSED BY PHYSALOSPORA MALORUM

No unusual reports of this disease occurred in 1925. The same general prevalence as in previous years was reported. Maryland reported 5 per cent loss.

MISCELLANEOUS DISEASES AND INJURIES

Black end (non-par.), Washington, California. From the latter state W. T. Horne reports the trouble increasing and rather widely distributed. It occurs largely on individual trees scattered through the orchards. According to Horne it seems to be worse on trees of Japanese stock in situations with fluctuating water conditions. Milbrath estimates 0.5 per cent loss in California on account of it. In Washington it was reported several times from the Yakima Valley.

Cercospora minima Tr. & Earle, leafspot, noted on sand pear at Gainesville, Florida.

Chlorosis due to excess of lime, Texas.

Corticium stevensii (Noack) Burt., hypochnose, Florida (defoliates trees and kills back the young limbs).

Gloeodes pomigena (Schw.) Colby (Phyllachora pomigena (Schw.) Sacc.) sooty blotch, Connecticut, New York.

Gloeosporium perennans Zeller & Childs, perennial canker, Oregon.

Gymnosporangium blasdaleanum (Diet. & Holw.) Kern, incense cedar rust, Oregon. "Not important, occurs in western Oregon, especially in Lane County, but is not a factor in the crop as a whole." (Barss)

Hendersonia foliorum Fckl., leafspot, Florida.

Ozonium omnivorum Shear, rootrot, Oklahoma, Texas.

Red leaf (non-par.), New York, fairly common on Kieffers.

Ring canker (undet.), California.

Septobasidium retiforme (Berk. & Curt.) Pat., canker, Florida, Texas. (Reported as Thelephora retiformis).

Recent literature on pear diseases

1. Hartman, Henry. The control of core break-down in pears. Oregon Agr. Exp. Sta. Bul. 216: 1-16. 1925.

2. Hendrickson, A. H. A chlorotic condition of pear trees. Proc. Amer. Soc. Hort. Sci. 21: 87-90. 1925. Also Blue Anchor 2: 6, 25-26. Nov. 1925.

3. Lipman, C. B., and A. Gordon. Further studies on new methods in the physiology and pathology of plants. Jour. Gen. Physiol. 7: 615-623. 1925. Chemical injections.

4. Milad, Y. The distribution of iron in chlorotic pear trees. Proc. Amer. Soc. Hort. Sci. 21: 93-98. 1925.

5. Ramsey, G. B., and L. F. Butler. Ammonia injury of fruits and vegetables. (Abstract) Phytopath. 16: 73. Jan. 1926.

6. Rose, D. H., and C. C. Lindegren. Phytophthora rot of pears and apples. Jour. Agr. Res. 30: 463-468. Mar. 1, 1925.

7. Van Poeteren, N. Verslag over de Werkzaamheden van den Plantenziektenkundigen Dienst in het jaar 1924. (Report of the activities of the Phytopathological Service in the year 1924.) Versl. en Meded. Plantenziektenkundigen Dienst te Wageningen 41: 62 pp. 1925.

QUINCE

LEAFBLIGHT CAUSED BY FABRAEA MACULATA (LÉV.) ATK.

Only six states reported on this disease. It was reported to be important in Connecticut where it occurred in greater prevalence than normally, and in New York the loss was estimated at 1 to 5 per cent. Defoliation followed a severe attack in certain parts of New York and Delaware.

Dates and location of earliest reported appearance of leafblight, 1925

April 14	Clemson College	South Carolina	July 20	Monroe County	New York
July	Seaford	Delaware	July 22	Wellingford	Connecticut

BLIGHT CAUSED BY BACILLUS AMYLOVORUS (BURR.) TREV.

Ten states reported on fireblight of quince. It is noteworthy that this organism affected quinces only slightly in 1925, while, as we have seen, it was the only disease of apples and pears which showed greater prevalence than normally. Only Massachusetts reported more blight on quince than in 1924. In that state, according to Davis, it was more prevalent on quince than on pear or apple. The only considerable losses reported were 10 per cent from Maryland and 3 to 5 per cent from New York.

Dates and location of earliest reported appearance of blight, 1925

May 20	Amherst	Massachusetts	June 14	Middlesex County	New Jersey
June 11	Georgetown	Delaware	June 22	LaPorte	Indiana

RUST CAUSED BY GYMNOSPORANGIUM GERMINALE (SCHW.) KERN

Quince rust was reported from six states, New Hampshire, Massachusetts, Connecticut, Maryland, Virginia, West Virginia, and Alabama. Maryland and Virginia reported normal amounts, while New Hampshire reported more than normal prevalence.

Dates and location of earliest reported appearance of rust, 1925.

June 10	Durham	New Hampshire
June 19	Strasburg	Virginia
August 1	Saybrook	Connecticut

MISCELLANEOUS DISEASES AND INJURIES

Frost - Maryland (2 per cent loss). Michigan, fruit reduced to the extent of 40 per cent.

Glomerella cingulata (Ston.) Spauld. & Schrenk, bitter rot, Connecticut.

Aerial galls, according to McClintock (1) aerial galls on quince are not crowngall but are similar to the "burr knots" described by Swingle (2) on apple and pear.

Recent literature

1. McClintock, J. A. Aerial galls of quince. (Abstract) Phytopath. 16: 78. Jan. 1925.

2. Swingle, C. F. Burr-knots of apple trees - its relation to crowngall and to vegetative propagation. Jour. Heredity 16: 312-320. 1925.

DISEASES OF STONE FRUITS

PEACH

The total peach production in 1925 was estimated to be 46,565,000 bushels compared with 54,119,000 bushels for 1924. The total value of the peach crop in 1925 was $65,086,000.00 compared with $68,679,000.00 in 1924. In the order of production in 1925, the states ranked as follows, California, Georgia, Arkansas, New York, and Texas. The state of California produced more than twice as many peaches as any other state.

Drouth and frost injury were very largely instrumental in reducing peach production in such states as Georgia, Virginia, Maryland, and West Virginia.

Fungous and bacterial diseases and other injuries of peaches were considerably less prevalent in 1925 than the year previous and normally. The total money loss due to diseases was very much less this year not only because of a lower average prevalence but also because the crop was comparatively small.

BROWNROT CAUSED BY SCLEROTINIA FRUCTICOLA (WINT.) REHM (S. AMERICANA (WORMALD) NORTON & EZEKIEL)

Brownrot of peaches was considerably less prevalent this year than in 1924 and normally. Only two states, Connecticut and New York, reported more

than in 1924. Of the other states, eight reported less, and six the same prevalence as in 1924. Two states, New Jersey and Delaware, reported more than normal prevalence, eight reported less, and five the same. We infer, therefore, that brownrot was of less importance this year than usually due, as mentioned in a number of reports, to dry weather.

Table 60. Estimated losses from brownrot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	South Carolina	2.5	New York
7	Maryland	2	Virginia, Ohio
5	Arkansas, North Carolina, Michigan	1	Delaware, Indiana, Kansas, Alabama, Texas
4	New Jersey, Connecticut	.5	Georgia
3	Kentucky, New Mexico	trace	West Virginia, Illinois

California, which produces by far the largest crop of peaches in the United States, did not report any loss from brownrot.

As in previous years, this disease manifested itself chiefly in the form of twig blight and fruit rot. The first mentioned form was considerably less important this year than usual due to dry weather at the time of blooming.

Dates and location of earliest reported appearance of brownrot, 1925

February 17	Frogmore	South Carolina	June 2	Waite Co.	North Caroli
April 25	Burlington Co.	New Jersey	June 5	Dover	Delaware
May 15	Fort Valley	Georgia	July 28	Weatherfield	Connecticut
June 1	Dutchess Co.	New York	Sept. 10	Leesburg	Virginia

New Jersey: Severe blossom blight in some orchards. Heavy losses from fruit rot in others. (Martin)

Virginia: An unusually severe infection by brownrot was noted at Leesburg on Bilyeu variety. In spite of the fact that one block of these peaches was sprayed eight times with dry-mix and the other block was sprayed five times with dry-mix and then dusted with sulfur dust on August 25, September 17 and 24, the crop in this orchard was practically a total loss. Fruit infection to the extent of 35 per cent appeared before fruit was ripe. The drops in these blocks showed 100 per cent infection. A conservative estimate of total fruit infection is 80 per cent. This orchard was very severely infested in 1924 and unless the disease is checked by a pre-blossom spray and severe pruning, this entire block of trees will have to be destroyed because it is acting as the center of infection to the other peaches in the orchard, which is the largest in Virginia. (Schneiderhan)

Georgia (Fort Valley): Not commercially important due to dry weather throughout the growing season. Apothecia were first observed in orchards March 2. This date is probably four to six days late as

some of the apothecia had started to dry up. No apothecia found after March 14. Blossom blight with the accompanying twig cankers did not attain any commercial importance even on the very susceptible varieties such as Uneeda and Mayflower. The summer continued hot and dry, but on October 29, following a short period of rainy weather, abundant rot was noted on fruit in small orchards of late peaches. (Dunegan)

Florida: Common on mature fruit generally in the northern part of the state. (Rhoads)

Ohio: Causing quite considerable losses in home orchards. Very little of the disease is noted in commercial orchards. (Young)

Indiana: A serious outbreak occurred in a commercial orchard of Krummels in Knox County in September. This orchard had been thoroughly sprayed and the difficulty is attributed to the high percentage of growth cracks that occurred as a result of the September rains. (Gardner)

Oregon: Of some importance in the Willamette Valley especially on late fruit. (Barss)

According to the report of the Chief of the Bureau of Plant Industry (8) for the year ending June 30, 1925, the application of sulfur dust two or three weeks before picking time in Georgia has reduced the development of brownrot on peaches in transit in cases where rains were common during the picking season, but in drier weather, this dusting has been unnecessary and of little value. A delay of a few hours in cooling peaches makes a decided difference in the character and amount of the rots that develop later in transit. Brownrot spores lodged in cuts and bruises on the peach develop even at a temperature of 41° F. but spores on the surface of the peach seldom develop rot at this temperature. At 48° F. and higher spores dusted on the peaches caused a fairly rapid development of rot without the aid of cuts and bruises in the skin. Dusting peaches by the use of aeroplanes appears to be promising in Georgia.

Barss (1) has reported that much loss is experienced annually in orchards of the Pacific Northwest from western British Columbia to western Oregon and perhaps farther south, from blighting of blossoms and killing of spurs, and sometimes cankering and girdling of twigs and smaller branches, followed by a negligible amount of fruit rot, caused by a species of Monilia differing from that ordinarily reported as "Sclerotinia cinerea" to which the name Monilia oregonensis Barss & Posey has been given. The principal hosts attacked are apricots, sour and sweet cherries, prunes, peaches, and pears, and quince and apple fruit has been found infected. The fungus winters in the blighted parts. Apothecia were not found, and were not produced under conditions favorable for their formation in "S. cinerea."

Ezekiel (4) studied cultures of M. oregonensis received from Barss, and also of a fungus isolated from decayed peaches, cherries, and apricots sent from California by B. A. Rudolph, and reported that "These were compared with a large population of other single-spore cultures, also collected in this country, and now all assigned to S. americana, and with S. cinerea and S. fructigena cultures from England and Holland. Of the California and Oregon strains mentioned above, all except that on apricot were found to be true S. cinerea."

Recent literature on brownrot

1. Barss, H. P. Serious blossom blight in Pacific Northwest orchards due to a species of Monilia. (Abstract) Phytopath. 15: 126. 1925.

2. Brooks, C., and D. F. Fisher. Spraying for brownrot in the Northwest. Amer. Fruit Grow. Mag. 45 (6): 10, 25, 34. June 1925. Also Blue Anchor 2 (9): 18-19, 36-37. Sept. 1925.

3. Ezekiel, W. N. Fruit-rotting Sclerotinias II. The American brownrot fungi. Maryland Agr. Exp. Sta. Bul. 271: 87-142. Oct. 1924.

4. ______________ Presence of the European brownrot fungus in America. Phytopath. 15: 535-542. 1925.

5. Haenseler, C. M. Plant diseases of New Jersey. Brownrot of stone fruits. New Jersey Agr. 7 (8): 6-7. Aug. 1925.

6. Muhleman, G. W. The pectinase of Sclerotinia cinerea. Bot. Gaz. 80: 325-330. Nov. 1925.

7. Schneiderhan, F. G., and R. H. Hurt. The dry-mix spray for peaches. Virginia Agr. Exp. Sta. Bul. 239: 1-16. Jan. 1925.

8. Taylor, W. A. Report of the Chief of the Bureau of Plant Industry 1925: 1-36. 1925. (Unnumbered report, U. S. Dept. Agr.)

LEAFCURL CAUSED BY EXOASCUS DEFORMANS (BERK.) FCKL.

Peach leafcurl is one of the best known and most widely distributed diseases of this fruit in the United States. The records show that there is no sharp geographical limitation to this disease, although certain states, particularly New York, Pennsylvania, Maryland, Michigan, and Oregon, have reported the greatest losses. The relation between cool, wet weather at the time of bud expansion and infection is well-known. Nothing new has been contributed in 1925 to the knowledge of this disease, although an excellent resumé of the whole subject has been given by Coons (1).

In 1925 leafcurl was considerably less prevalent than in the previous year and normally. Only three states, Delaware, Kansas, and California, reported a greater prevalence than 1924, while ten states reported less, and six the same prevalence as last year. Comparing this year's prevalence with normal only two states, Delaware and Kansas, reported more, eleven states reported less, and five the same as normal.

Losses resulting from peach leafcurl this year were not severe. The records of the past eight years indicate that crop losses to the extent of 20 per cent have been reported. This year the highest loss, 3 per cent, was reported from Kansas and Maryland. A number of reports, including those from Massachusetts, New Jersey, Delaware, Maryland, Virginia, Oregon, and California, stated that the disease was abundant in unsprayed or poorly sprayed orchards, or where spray was applied late.

Table 61. Estimated losses from leafcurl as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
3	Maryland, Kansas	trace	New York, West Virginia, Alabama, Illinois, Michigan, Maine, Kentucky, Oklahoma, Arkansas, Idaho
2	South Carolina, North Carolina, Oregon		
1.5	Delaware, Texas		
1	New Mexico, Michigan		
.5	New Jersey, Virginia, Ohio, California		

Dates and location of earliest reported appearance of leafcurl, 1925

April 14	Crozet	Virginia	May 6	Dutchess County	New York
April 14	Clemson College	South Carolina	May 15	Vineland	New Jersey
April 16	- - -	Delaware	June 1	- - -	New Hampshire
April 23	Orange County	Indiana			

Some interesting and informative reports were submitted by various collaborators. Among them the following are noteworthy.

Delaware: Injury noted on leaf and shoot. Was general throughout the state. Delay in putting on dormant spray favored greater general increase over last year. (Adams)

Illinois: No leafcurl was observed in the peach growing section this year in sprayed orchards regardless whether sprayed with oil-emulsion or lime-sulfur. (Anderson)

Kansas: Leafcurl is evidently more severe in the southeast part of the state than normally due to a very wet spring. Some defoliation has been reported as due to leafcurl. In general a dormant spray of lime-sulfur has given satisfactory control. (White)

Washington: Present in both eastern and western Washington, but less abundant than usual. Not in the central irrigated valleys. (Dept. Plant. Path.)

Oregon: General and serious wherever not controlled. Prolonged cool, wet spring. A grower in the Willamette Valley reports "Very bad in most orchards as the spraying was delayed due to rainy weather at spray time." Can be controlled perfectly by winter spraying with Bordeaux. Elberta is the only commercial variety severely affected by leafcurl, but this variety is quite largely grown. (Barss)

California: It appears now that fruit was affected. This was deformed. Growers sprayed too late on account of the rains. (Milbrath)

Recent literature on leafcurl

1. Coons, G. H. Old and new facts about peach leafcurl. Amer. Fruit Grow. 45 (2): 33, 46-47, 53. 1925.

2. Encke, F. von. Die Kräuselkrankheit des Pfirsichs. Deut. Obst- u. Gemüseb. Zeit. 71: 287-288. May 22, 1925.

3. Mix, A. J. The weather and peach leafcurl in eastern Kansas in 1924. Phytopath. 15: 244-245. 1925.

SCAB CAUSED BY CLADOSPORIUM CARPOPHILUM THUEM.

Scab appeared to be far less prevalent this year than usual, as indicated by the fact that only one state, Delaware, reported more of the disease than normal, while ten reported less, and two the same. The same figures are true of the comparison between the 1925 prevalence and that of 1924 with the exception that only Connecticut in addition to Delaware reported more scab.

Scab is probably easier to control in average seasons than any other fungous disease of the peach. The regular spray programs applied in 1925, aided by weather conditions distinctly unfavorable to the development and spread of the fungus, especially in the southern and eastern Appalachian section, resulted in a very low loss this year. The following table gives the losses reported.

Table 62. Estimated losses from scab as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
2	North Carolina	.75	Connecticut
1.5	Maryland, Georgia	.5	Virginia, New Jersey
1	Florida, Alabama, [illegible] Delaware, Mississippi Texas, Arkansas, Ohio	trace	New York, West Virginia, Michigan, Kansas

Dates and location of earliest reported appearance of scab, 1925

April 20	Burlington	New Jersey	July 2	Crozet	Virginia
April 23	Lawrence County	Indiana	July 22	Cherau	South Carolina
April 29	Bridgeville	Delaware	August 1	Westville	Connecticut
June 17	Powersville	Georgia	August 10	Green County	New York

A record of conidial development on cankered peach twigs at Crozet, Virginia, kept by Hurt, table 63, indicates that conidia are produced over a comparatively long period of time and after practically every rain.

Table 63. Data concerning peach scab conidial production, Crozet, Virginia, 1925 (from R. H. Hurt).

Date	Extent of production	Rainfall (inches)
May 24	Light	0.19
June 6	Medium	0.27
June 24	Heavy	0.76
June 27	Heavy	0.85
July 6	Heavy	0.95
July 8	Heavy	0.68
July 9	Medium	0.39
August 4	Light	0.20
August 9	Heavy	0.75
August 10	Light	0.19
August 11	Heavy	0.55
August 12	Heavy	0.24
August 21	Light	0.11

Delaware: Heavy twig infection. Slight increase on fruit. (Adams)

Virginia: Unusually late in appearing. (Fromme)

North Carolina: Rather prevalent despite the drouth. (Fant)

Georgia (Fort Valley): Due to dry weather, scab was not commercially important except in neglected orchards. First evidence of disease seen on May 4 on Elbertas. On June 17 the disease was found on unsprayed seedlings near Powersville, Georgia. The spots on these fruits were fairly numerous. Later, July 8, it was found on commercial fruit at picking time in an orchard that had not been properly cared for. Numerous cankers on the twigs were probably the source of the infection. Following the first rains in October after a long dry period, numerous scab spots developed upon unsprayed foliage. The fungus was sporulating vigorously on the spots and cultures were readily obtained. Leaves bearing these spots could still be collected in the early part of November but at this time the spots were not as large nor as numerous although they were sporulating freely. (Dunegan)

Ohio: Scab is quite general throughout the central portion of the state, especially in unsprayed orchards. (Young)

BACTERIAL SPOT CAUSED BY BACTERIUM PRUNI EFS.

Compared to previous years, bacterial spot was very much less prevalent. Only two states, New York and Kansas, reported more shot-hole than in 1924, and only Kansas reported more than normal, while nine states reported less than normal, and eleven less than 1924.

PEACH - Bacterial spot

The losses in 1925 were not great, the heaviest reported being 5 per cent in North Carolina.

The accompanying table 64, gives the losses reported from the various states.

Table 64. Estimated losses from bacterial spot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
5	North Carolina	trace	New Jersey, Maryland, Virginia, Michigan, Iowa, Arizona
1	Alabama, Texas, Kansas, New York		
.5	Illinois		

In the states reporting losses, the Elberta and Hale varieties seem to have been the most susceptible.

Dates and location of earliest reported appearance of bacterial spot, 1925

April 29	Fort Valley	Georgia	June 26	Moore County	North Carolina
May 7	Lawrence County	Indiana	June 29	Orange County	New York
May 14	Bridgeville	Delaware	July 22	McBee	South Carolina
May 17	Winchester	Virginia	July 29	Bridgeton	New Jersey
May 29	Ozark	Illinois			

New York: Reported as rather general but it is difficult to determine how much was caused by this injury or by spraying. Heavy loss of foliage in a few orchards of Niagara County. (Chupp & Pierstorff)

Delaware: Defoliation at this time generally less than last year. Heavy twig infection found for the first time on Elberta, May 28. (Adams)

North Carolina: Shipping point inspectors report damage to Hales and Elbertas running as high as 30 per cent in some instances. (Fant)

Georgia: Due to dry season, this disease is of minor importance in Fort Valley belt. Initial infection could be attributed directly to bacteria overwintering on the twigs. First noted April 29. These spots on the fruit were small and contained practically pure cultures of the organism. No defoliation observed during the season. No twig cankers found on the 1925 wood. (Dunegan)

Oklahoma: Not plentiful as last year. Very little fruit injury by this organism during this season. Leaf infections more or less plentiful in most orchards. (Rolfs)

Indiana: Too dry in April and May. (Gardner)

PEACH - Bacterial spot

Illinois: Bacterial shot-hole appeared late this season due to the dry weather during the period when initial infection usually takes place. Defoliation in fertilized orchards was not as severe as in those not nitrated. Mainly on Elberta and Hale. Very little fruit infection and foliage inclined to hold better than usual. (Anderson & Tehon)

Kansas: Common and serious this year in Coffey County. Sixty-five to seventy-five per cent of twigs killed back as much as half of last year's growth. (White)

In 1925 an advance seems to have been made in the control of bacterial spot as a result of work done by Anderson (2) of Illinois. He reported as follows:

"Spraying experiments on peach for control of bacterial spot (shot-hole) during 1925 at Urbana, Illinois, demonstrated the possibility of control with a spray of sodium silicofluoride in water. Preliminary laboratory tests proved this substance effective in preventing growth in broth cultures in dilutions of 1-3,000. Seven applications were made, ten to fourteen days apart. Various concentrations were used. One containing two pounds in 50 gallons of water proved satisfactory. The checks showed from 10 to 90 per cent diseased leaves on October 1, while very few infections could be found on the sprayed trees. It is probable from the dates of infection that only three of the seven sprays would have been necessary for control. Sulfur sprays first gave increased infection over the checks, due probably to wetting the trees during spraying. Later the checks were more heavily infected. No injury to the foliage resulted from the use of the sodium silicofluoride, neither in the orchards nor in the greenhouse where preliminaryttests were made. This season's weather conditions were so abnormal, however, that no assurance can be given that that injury will not result in other seasons. Copper sprays, including two brands of colloidal copper and Bordeaux mixture, caused serious spray injury."

The same author (3) also contributed the results of five years of investigation on the overwintering habits of Bacterium pruni under Illinois conditions, indicating that the pathogenic organism does not overwinter entirely in cankers on twigs as reported from other states but also on leaves. No difficulty was experienced in isolating the bacterium from leaves in the spring. The exact method of inoculation is not known but the author assumes that the bacteria occurring in the gelatinous masses are blown as dust to the green leaves and when moistened readily cause infection.

Recent literature on bacterial spot

1. Adams, J. F. The defoliation of peach trees in relation to spray materials and bacterial shot-hole. Trans. Penin. Hort. Soc. 38: 17-21. 1925.

2. Anderson, H. W. Control of bacterial spot of peach with sodium silicofluoride. (Abstract) Phytopath. 16: 79-80. Jan. 1926.

3. ______________ Overwintering of Bacterium pruni. Phytopath. 16: 55-57. Jan. 1926.

4. ______________ Shot-hole or bacterial spot of peach. Amer. Fruit Grow. Mag. 45 (2): 26, 38-39. 1925.

5. ______________ Some observations on bacterial shot-hole of peach. Trans. Illinois State Hort. Soc. 58: 488-497. 1925.

6. Jehle, R. A. Black spot or bacterial crack of the peach. Trans. Penin. Hort. Soc. 38: 15-16. 1925.

BLIGHT CAUSED BY CORYNEUM BEIJERINCKII OUD.

Peach blight was reported from Ohio, Michigan, Colorado, Idaho, Washington, Oregon, and California. California reported a crop reduction of 3 per cent due to this disease, which is of more importance in the far western, than in the eastern and southern states. Other losses reported were Ohio, 1 per cent; and Michigan and Colorado, a trace.

Michigan: No varietal resistance noted. Five sprays as applied failed to give satisfactory control. (Bennett)

Idaho: Prevalent in Northern Idaho, especially where San Jose scale is present. The spray for that pest seems to control Coryneum blight. (Hungerford)

Washington: Known to occur in practically all sections of the state. (Dept. Plant Path.)

Oregon: Leaf, twig, and fruit spot; bud blight west of Cascades. Twenty per cent of stone fruits reported badly spotted in Rogue River Valley. Good control where sprayed. (Barss)

California: Found in central California in the cling peach district. The fungus was active much longer than usual. Found it active in May on new wood. (Milbrath)

Recent literature

1. Duruz, W. P. California peach blight or shot-hole fungus. Blue Anchor 2 (2): 15, 38. 1925.

YELLOWS (CAUSE UNDETERMINED)

From the 10 reports submitted we conclude that yellows occurred about as usual in most of the states, although in Ohio and Michigan it was reported in greater prevalence than normal. In New York it was reported occurring scatter-

ingly in Greene and Columbia Counties. Massachusetts reports the disease as becoming less important. In Michigan it was reported more prevalent this year than usual, occurring in such amounts as to assume the nature of an epiphytotic. Concerning the situation in that state, C. W. Bennett writes as follows:

> "I have spent about two weeks this summer visiting various orchards in which yellows is present and I think we can be very sure that yellows is present in quite a number of orchards in the state, (chiefly in Berrien and Van Buren Counties)--- A great many trees have been condemned by inspectors."

The question as to whether yellows is gradually disappearing is an important one. Accordingly collaborators in a number of states on the outer border of the original yellows area were asked as to whether or not yellows occurred in their states. The two negative replies from Indiana and Illinois follow:

> "We feel quite confident that peach yellows does not occur in Indiana at the present time. Neither Doctor Jackson nor I have ever seen any cases of the disease and I think we have been in most of the commercial peach orchards. Furthermore, the men in the Horticultural Department who know the commercial orchards from one end of the state to the other, assure me that there is none of the disease present and that there has not been any for a considerable period of time. It seems very strange that such a disease could disappear so completely, but nevertheless such seems to be the case." (Gardner)

Writing about peach yellows in Illinois, Anderson states:

> "I think I have been in every peach orchard in the state, of any size, and have seen them at various seasons of the year. I can say with the utmost confidence that peach yellows does not occur in this state and probably never has occurred with one possible exception. Professor Burrill reported peach yellows as appearing here at one time in the nineties, but while he saved specimens of this disease which indicate yellows, I am not satisfied that this was the real cause of the condition. I am quite sure that I am safe in saying that the disease has not occurred in Illinois during the last ten years."

Table 65. Estimated losses from yellows as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
2	Maryland, New Jersey	.25	Delaware
1	Connecticut, Ohio	trace	Massachusetts, New York,
.5	Michigan		Virginia, West Virginia

Yellows was reported from Massachusetts, Connecticut, New York, New Jersey, Delaware, Maryland, West Virginia, Virginia, Ohio, and Michigan. No reports were received from Pennsylvania but it is known to exist there. It was noted July 24 at Hadlyme, Connecticut, and on July 6 in Greene County, New York.

LITTLE PEACH

Little peach was reported from Michigan, New York, New Jersey, Delaware, and Maryland. In Michigan it was said to be of considerable importance locally, occurring chiefly in the west central part of state.

SPRAY INJURY

If there is one particular phase of spray information that needs clarifying it is the spray injury problem. Fundamental research is necessary to establish both the particular set of weather, chemical, and other factors combining to cause spray injury; and also the especial features of arsenical, lime-sulfur, and other types, of which we have only a hazy and indefinite conception at present.

Peaches are particularly susceptible and in the aggregate great losses result in the United States each year. In 1925, apparently, a smaller amount occurred than last year.

New Jersey: Where the amount of lead arsenate in dry-mix was reduced to one pound, only slight injury was observed. (Dept. Plant Path.)

Delaware: Spray injury observed May 22 as typical spotting and marginal burning. Cold, wet weather has predisposed leaves to injury. Dust injury very slight when applied during day compared with night dusting. (Adams)

South Carolina: "Sulphocide" at the rate of 3/4 gallons to 150 gallons of water applied to Mayflower peach resulted in spotting and reddening of leaves around patches of spray residue. Later, many of the spots fell out leaving a shot-hole effect. (Ludwig)

Indiana: Bordeaux sprays applied April 9, 23, and May 6 resulted in shot-hole effect on leaves. Injury was apparent June 5. (Gardner)

Farley (1) presents certain recommendations among which are the following:

1. Lead arsenate alone or in combination with lime should never be applied to growing peach trees.

2. One pound of powdered lead arsenate to 50 gallons of standard dry-mix is the maximum compatible with safety during growing season.

3. Hydrated lime containing 90 per cent or more of calcium oxide should be used in preparing dry-mix.

4. Great care must be exercised in weighing ingredients before mixing them in the spray tank.

Recent literature

1. Farley, Arthur J. Spray injury to peaches. Amer. Fruit Grower 45 (6): 12, 15. 1925.

WINTER AND FROST INJURY

The same serious aspect of frost injury and freezing of buds discussed under this heading for apple injury, holds true for peaches. There can be no doubt that whenever frost injury is general the total aggregate losses are greater than from any other single cause. This fact is brought out clearly in the 1925 report on frost injury of peaches. Percentage losses reported were Maryland, 75 per cent; Virginia, 90 per cent; West Virginia, 99 per cent; Michigan, 65 per cent; and Iowa, 50 per cent; while reports from other states not giving definite estimates indicate severe injury.

Delaware: Blossoms killed on April 7; temperature Sussex County 29° F. The percentage losses to different varieties in Kent County were as follows: Elberta, 50 per cent; Carman, 40 per cent; Georgia Belle, 50 per cent. (Adams)

Arkansas: Blossom injury in northern counties cut down yield enormously. (Dept. Plant Path.)

Illinois: Temperature of 8 to 20 degrees below zero killed fruit buds except in extreme southern section of the state. (Anderson & Tehon)

Michigan: Blossoms killed by late frost; most severe in Berrien County. (Bennett)

Utah: Utah was hard hit by the cold weather last winter and while a few favored spots will have a fair crop the damage the state over is very severe. (Kingsbury)

Idaho: Fifty per cent of the trees in the state killed by severe frost of December 1924. (Hungerford)

Colorado: At Palisades near Grand Junction, Colorado, there were heavy losses in peach orchards due to excessively low temperatures of the preceding winter. The weak trees suffered more than the vigorous ones. (Brooks)

MISCELLANEOUS DISEASES AND INJURIES

Armillaria mellea (Vahl.) Quel., rootrot, Texas (trace).

Bacterium tumefaciens EFS. & Town., crowngall, Texas (quite prevalent), New Mexico (slight importance), South Carolina (serious in most old orchards and nurseries), Arizona (2 per cent loss). In Georgia O. C. Boyd reported as follows: "Several orchards of Hiley, Georgia Belle, and Elberta in Mitchell and Dougherty Counties beginning to lose foliage due to the disease; trees 3 to 8 years old. One orchard, 5 per cent of trees lost."

Cercosporella persica Sacc., frosty mildew was reported from Florida and Georgia.

Clitocybe monadelpha (Morg.) Sacc., rootrot, Oklahoma (considerable loss in southern part of state on newly cleared land).

Diplodia natalensis Ev., footrot, Florida (not common on peach but caused considerable damage as a footrot of young trees and a limb blight of older trees).

Fusarium spp., rot, California (5).

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb), root knot, South Carolina (common).

Phoma persicae Sacc., canker, Delaware.

Ozonium omnivorum Shear, Texas rootrot, Texas (trace; unimportant), Arizona (4 per cent loss).

Rhizopus nigricans Ehr., Rhizopus rot. Common rot in transit and during marketing (2).

Sphaerotheca pannosa (Wallr.) Lév., powdery mildew. Of minor importance in Oregon, Texas, and New York.

Valsa leucostoma (Pers.) Fr., dieback, Missouri.

An undetermined leaf and twig blight associated with Fusarium and Rhynchosporium proved troublesome in Coffee and Cherokee Counties, Kansas, according to R. P. White.

Chlorosis (non-par.), Texas, New Mexico (extremely common this year. Apparently securing at least temporary relief by the use of iron sulfate).

Mottle leaf (undet.), New Jersey (not serious, trace injury, observed in Monmouth and Cape May Counties).

Phoney disease, The phoney disease of peaches in Georgia has been increasing in severity. The diseased trees in the old infested areas have increased and the general area has extended quite widely year by year but, so far as known, has not spread beyond the state of Georgia. At the present rate of progress, however, it may be expected to reach other states in a very few years. The results of all experiments to control this trouble have been astonishingly negative. A tree once affected always continues to be diseased. The absence of any effect of soils, fertilizers, or other treatment points away from physiological or nutritional types of disease. This trouble, therefore, stands out distinctly as the least understood of all fruit diseases, if not of all plant diseases. (Rept. of the Chief, Bureau of Plant Industry to the Secretary of Agriculture for the fiscal year ended June 30, 1925).

Recent literature on peach diseases

1. Adams, J. F. The leaf-scar lesions on peach trees. Trans. Penin. Hort. Soc. 38 (1924): 22-24. 1925.

2. Anderson, H. W. Rhizopus rot of peaches. Phytopath. 15: 122-124. Feb. 1925.

3. Briton-Jones, H. R. On the diseases known as 'bark canker' and die back in fruit trees. Jour. Pomol. & Hort. Sci. 4: 162-183. 1925.

4. Eddy, E. D. A storage rot of peaches caused by a new species of Choanephora. Phytopath. 15: 607-610. Oct. 1925.

5. McClintock, J. A. Uncongenialty a limiting factor in the use of disease resistant stock. Proc. Amer. Soc. Hort. Sci. 21: 319-320. 1925.

6. Plakidas, A. G. Fusarium rot of the peach. Phytopath. 15: 92-98. Feb. 1925.

7. Roberts, J. W. Unusual defoliation of peach trees due to active chlorine. U. S. Dept. Agr. Off. Rec. 4 (33): 5. Aug. 1925.

8. Smith, R. E. and E. H. Smith. Further studies on Pythiaceous infection of deciduous fruit trees in California. Phytopath. 15: 389-404. 1925.

9. Tryon, H. Gumming of drupaceous fruit trees. Queensland Agr. Jour. 24: 120-122. Aug. 1925.

PLUM AND PRUNE

BROWNROT CAUSED BY SCLEROTINIA FRUCTICOLA (WINT.) REHM. (S. AMERICANA) (WORMALD) NORTON & EZEKIEL

Although slightly less in the aggregate than in 1924 and normally, brownrot of plums was, as usual, an important economic factor. Twenty-two states reported on brownrot and of these, only three, Massachusetts, Connecticut, and Oregon reported more of the disease than in 1924, while six states reported less, and the remainder the same prevalence as 1924. Massachusetts, Delaware, and Oregon reported more brownrot than in average years. New Jersey, West Virginia, Arkansas, Ohio, and Michigan reported less, while Connecticut, Maryland, Alabama, Louisiana, North Dakota, Kansas, and New Mexico reported the same prevalence as in average years. The losses reported by the collaborators for 1925 were as follows:

Table 66. Estimated losses from brownrot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	Ohio	1	Kansas, West Virginia, Georgia
8	Wisconsin		
7	New York, Maryland	.5	Delaware, Texas
5	Connecticut, New Jersey, Michigan	trace	Virginia, Maine, Minnesota, North Dakota, California, Arkansas.
4	Kentucky		
2	New Mexico		

Dates and location of earliest reported appearance of brownrot, 1925

May 1	Newark	Delaware	August 10	Middlesex	New Jersey
May 13	Douglas County	Oregon	August 25	Madison	Wisconsin
July 24	Hadlyme	Connecticut	August 31	Steel County	Minnesota

Oklahoma: Quite plentiful in eastern Oklahoma. Not so abundant in western Oklahoma this year. (Rolfs)

Ohio: Outbreaks are apparently common now owing to the recent rains and to the fact that plums are ripening. (Hesler)

Minnesota: Sapa and Opata varieties found very susceptible to brownrot. (Sect. Plant Path.)

North Dakota: Plum and sand cherry hybrids very susceptible. (Brentzel)

Oregon: Very severe in early part of season; general but not serious at harvest time. In some orchards of Petites at least 50 per cent of the green fruit was attacked during May. Present to a slight extent in Italians also. Over 95 per cent of the prunes grown in Oregon are Italian prunes. (Barss)

Recent literature on brownrot (see also under peach)

1. Lees, A. H., and H. R. Britton-Jones. Plum aphis and brownrot control. Jour. Pomol. & Hort. Sci. 4: 196-199. June 1925.

2. Willaman, J. J., N. C. Pervier, and H. O. Triebold. Biochemistry of plant diseases. V. Relation between susceptibility to brownrot in plums and physical and chemical properties. Bot. Gaz. 80: 121-144. Oct. 1925.

BLACK KNOT CAUSED BY PLOWRIGHTIA MORBOSA (SCHW.) SACC.

This disease was not reported as serious in any state this year. In most cases it was said to be of very slight importance, although common in neglected orchards or on wild plum.

Table 67. Estimated losses from black knot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
4	New Mexico	.5	Michigan
2	New York, West Virginia	trace	Virginia, Texas, Illinois, Iowa
1	Maryland		

LEAFSPOT CAUSED BY COCCOMYCES PRUNOPHORAE HIG.

Of six states reporting on leafspot of plum, four indicated less prevalence than normal. The disease was of no economic importance this year, the highest loss reported being a trace to 2 per cent from New York. New Jersey, Maryland, and Michigan reported a trace of loss. In Alabama it was seen on wild plums, causing defoliation.

POCKETS CAUSED BY EXOASCUS PRUNI FCKL. AND E. COMMUNIS SADEB.

These diseases were reported from Maryland (trace), West Virginia (merely observed), Florida (very common on wild plums wherever grown; 100 per cent fruit infected in many cases), Texas (very prevalent due to cold, late spring), Michigan (of little importance), Wisconsin (same as usual, mostly in northern counties, of major importance on American plums in northern Wisconsin), Minnesota (unimportant, plums were almost a complete failure on account of frost), North Dakota (not as common as usual, wild plums, choke cherries and hybrids of these are very susceptible), Nebraska (considerable), Kansas (on wild plum mostly, one report on cultivated plum), New Mexico (same as usual, slight importance).

BACTERIAL SPOT CAUSED BY BACTERIUM PRUNI EFS.

Bacterial spot was reported to be unimportant on plum, the only loss estimate greater than a trace being one-half per cent in Texas.

<u>New York</u>: Never very important. Although reported repeatedly as general, it is difficult to determine how much is this disease, and how much is spray injury or Coccomyces. (Chupp & Pierstorff)

<u>Georgia</u>: This disease did not assume any commercial importance in the few plum orchards in the Fort Valley section. One orchard, which in 1924 had 85 per cent of the trees showing dead or dying twigs caused by this organism, had only a slight infection in 1925 and no dead twigs due to girdling by cankers. (Dunegan)

<u>Oklahoma</u>: The foliage and twigs of all the Japanese varieties are more or less infected. Foliage injury not so marked as last season. (Rolfs)

<u>Minnesota</u>: Found on Red Wing plums only. Leaves only affected. No fruit on trees because of frost. (Sect. Plant Path.)

Other states reporting its occurrence on plum are Delaware, Maryland, Alabama, Louisiana, Arkansas, Ohio, and Michigan. An interesting report on the relative susceptibility of plum varieties in the variety orchard of the Ohio Experiment Station was prepared by Hesler (Pl. Dis. Reporter 7: 86-88. Sept. 15, 1925). The only variety particularly susceptible to infection on leaves, twigs, and fruits was "Gee Whiz". None of the best commercial Domestica plums

were susceptible, with the exception of Coates Improved French prune, which showed heavy infection on fruit pedicels. The commercial imported Damsons were also free of the disease. The triflora plums, Shiro and Burbank, were the only commercially valuable varieties that showed high susceptibility.

WINTER AND FROST INJURY

The states of Delaware, Maryland, Michigan, Wisconsin, Minnesota, Iowa, and South Dakota report great reduction in the crop due to killing of the blossoms by late frosts. In some of these states this injury was a limiting factor in crop production. For instance, in Maryland the loss was thought to be about 90 per cent due to killing of young fruits by a May freeze. In Michigan 40 per cent loss on account of late frost occurred, while in Minnesota and Iowa 90 and 50 per cent loss was estimated respectively. The crop was practically a total failure in Minnesota.

<u>Idaho</u>: We found considerable winter injury on prunes in the Payette and Boise Valleys. The location of the injury was usually on the south side of the trunk or in the crotch and often extended from the ground line up to the lower branches and in some cases the exposed branches were also affected. In some instances the general growth conditions of the tree did not seem to have been affected, but in others, the branches immediately above the injury were dying. A Cytospora was present on some of the injured areas.(Brooks)

<u>Washington</u>: Italian prunes in the Walla Walla section particularly and also more or less generally over eastern and central Washington have shown a particularly heavy drop at the time the fruits were nearly full grown. Many of the fruits not dropping showed drought spot or gum spot in the flesh of the fruit. The condition was analyzed to be largely the result of severe winter injury to the trees during December 1924. This delayed effect of winter injury reduced the yield of marketable fruit to a small fraction of what was expected by growers. Injury was also apparent on the tree in the form of delayed effect of injury to twigs and branches. On the branches the progressive effect of winter injury became evident after the advent of dry, hot weather. On those branches where this progressive yellowing and death took place the entire set of fruit either dropped off or was of such poor quality as to be of no value. This delayed effect of winter injury coupled with the reduced set of fruit caused by spring frosts was a severe blow to the industry in the affected regions. (Dept. Plant Path.)

DROUGHT INJURY

<u>Leafroll and fruit drop</u>, of unknown cause but probably due to lack of moisture, was more severe than for the last five years in Idaho, according to Hungerford.

Leafrolling and dropping due to excessive transpiration and drought following a cool,wet spring was more important than usual in Oregon. It does not

usually occur in the irrigated sections of the eastern part, but in 1925 it was general throughout the state. Barss said that injury to growth and fruit setting is expected to show up next spring.

Gum spot of fruit was general and very important in both eastern and western Oregon. Its occurrence is unusual in irrigated sections in eastern Oregon, where it showed up this year. It was especially bad in the Milton-Freewater district, where 80 to 85 per cent of the prunes were graded second grade due to this trouble. (Barss)

OTHER DISEASES AND INJURIES

Armillaria mellea (Vahl) Quel., rootrot, Oregon (general in western part on old oak land).

Bacterium tumefaciens EFS. & Town., crowngall, Florida (on nursery stock), Oregon (probably general but only locally important).

Fumago vagans Pers., sooty mold, Washington.

Ozonium omnivorum Shear, rootrot, Arizona (1 per cent loss).

Podosphaera oxyacanthae (DC.) DBy., powdery mildew, Florida (causing serious twig blight on growing trees).

Tranzschelia punctata (Pers.) Arth., rust, Florida, Texas, California, and Oregon. In Florida it was collected on wild plants near Gainesville on which it caused defoliation in the late summer. In Oregon, according to H. P. Barss, in one four-year old orchard this disease caused bad defoliation in Date prunes, as much as 75 per cent in spots, while Italians alongside were not badly affected. In another orchard in the same county, however, Italians were seriously affected. In California, Milbrath reports it in the central and northern parts of the state causing a loss estimated at 0.5 per cent.

Valsa leucostoma (Pers.) Fr., dieback, Texas, Missouri, Kansas.

Black-end (non-par.), Washington.

Chlorosis (too much lime), Texas (traces).

Rough bark disease (non-par.), Washington (on Italian prune).

Leafspot (non-par.), Washington (Yakima Co.)

Recent literature on plum diseases

1. Ducomet, V. La rouille du prunier. Rev. Path. Vég. & Entom. Agr. 11: 262-267. Oct.-Dec. 1924.

2. Entomologists and plant pathologists of the Agricultural Experiment Stations and Colleges of Agriculture. Spray Calendars for various sections of the country. Amer. Fruit. Grow. Mag. 45 (2): Feb. 1925.

3. Mix, A. J. Biological and cultural studies of Exoascus mirabilis. Phytopath. 15: 214-222. 1925.

4. Smith, R. E., and E. H. Smith. Further studies on Pythiaceous infection of deciduous fruit trees in California. Phytopath. 15: 389-404. 1925.

CHERRY

BROWNROT CAUSED BY SCLEROTINIA FRUCTICOLA (WINT.) REHM (S. AMERICANA (WORMALD) NORTON & EZEKIEL)

This disease seemed to be of comparatively slight importance in most of the cherry producing states this year. Only Indiana and Oregon reported greater than average prevalence.

The losses from brownrot of cherries for 1925 were reported as follows:

Table 68. Estimated losses from brownrot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	California, Maryland	1.5	New York
5	Michigan	1	Ohio, Illinois
4	New Jersey	.5	Wisconsin
3	Connecticut, Oregon	.25	Delaware
2	New Mexico, South Carolina, Virginia, Arkansas	trace	West Virginia, Iowa, Maine, Kentucky

New York: Better control measures this year because canners brought pressure to bear on the growers. (Chupp & Pierstorff)

Arkansas: No blossom blight has ever been noted in Arkansas. (Dept. Plant Path.)

Indiana: Serious fruit rot in southern Indiana; 10 to 15 per cent incidence reported in a car from Floyd County inspected by United States inspectors. (Gardner)

Kansas: Found on small green cherries. Unusual. (White)

Oregon: Abundant blossom blight and severe rot of green and ripened fruit. Spraying not a general practice for this disease. Weather very favorable. Dry, hot weather in late June and July checked the outbreak somewhat. (Barss)

California: Very bad. Occurred in all cherry districts, causing loss of 10 per cent. Disease followed spring rains. (Milbrath)

According to Brooks and Fisher (1) spraying for the control of brownrot in the northwest cherry sections has been very successful. The disease is said to be one of the most serious problems in successful cherry growing and marketing in that section.

Recent literature

1. Brooks, Charles and D. F. Fisher. Spraying for brownrot control in the Northwest. Amer. Fruit Grow. 45 (6): 10, 25, 34. 1925.

LEAFSPOT CAUSED BY COCCOMYCES HIEMALIS HIG.

Of the 16 states reporting on leafspot, 11 reported less than normal prevalence, while Connecticut and Oregon reported more than usual. Dry weather was mentioned, in many cases, as the cause of the reduced amount of leafspot.

Table 69. Estimated losses from leafspot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	Maryland	.5	New York, New Jersey, Ohio, Illinois, Wisconsin
5	Michigan, Iowa		
2	Kentucky		
1	Kansas, Virginia	trace	Delaware, West Virginia, Arkansas

New Jersey: Not important this year. Appeared late in the season. The weather was hot and dry at picking time and consequently the disease was not severe. (Martin)

Florida: Leafspot was apparently in all sections of the state where host plant grew. It was of little importance, however. (Weber)

Michigan: Of some importance locally; minor in the southern half of the state, but heavy, late infection in northern half. Late infection result of dews. Temperature relatively high during the period of infection. (Bennett)

Wisconsin: Leafspot is not feared by leading cherry growers because it is so well kept under control by spraying. Lime sulfur and arsenate of lead applied wet is a general practice. Some minor dusting is being tried out. (Vaughan)

Missouri: Much damage to unsprayed trees which were often defoliated. (Maneval)

Nebraska: Common and severe. (Goss)

Kansas: Checked by proper spraying with bordeaux or lime-sulfur. (White)

Oregon: Unusually abundant in western Oregon; caused much damage to small crop of sweet cherries set. Attacked pedicels, as well as leaves, and caused shrivelling of fruit. Long, cool, wet spring. (Barss)

Observations on leafspot in Wisconsin (2) show infection is caused by spores discharged about June 15. In cool, moist weather the spray program will hold the disease in check.

Dutton and Wells (1) give a brief description of the disease and some data as to its effect on yield and growth of trees. Trees defoliated in previous years were found to produce relatively few small blossoms. The total production and the vigor of the trees following defoliation were greatly reduced. In the control investigations, the authors found that Pyrox could not be used satisfactorily on cherries because of serious foliage injury. Lime-sulfur is satisfactory for control, caused no foliage injury and did not reduce the size of the fruit. The authors recommend liquid lime-sulfur diluted at the rate of three gallons to a hundred for the control of leafspot on sour cherries in Michigan.

Recent literature

1. Dutton, W. C., and H. M. Wells. Cherry leafspot: Residual effects and control. Michigan Agr. Exp. Sta. Bul. 147: 3-15. 1925.

2. Russel, H. L., F. B. Morrison, and W. H. Ebling. Plant disease investigations of the Wisconsin Station. In (Annual Report of Director) Wisconsin Agr. Exp. Sta. Bul. 373: 5-16. 1925.

FROST INJURY

Considerably more than normal frost injury was reported from Delaware, Maryland, Virginia, Illinois, Michigan, Wisconsin, Iowa, and Idaho. High losses were reported from some of these states as indicated by the following table:

Table 70. Estimated losses from frost as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
90	Maryland, Virginia	25	Wisconsin
80	Iowa	12	New Mexico
50	Michigan		

WINTER INJURY

Washington: Cherries in all parts of the state were severely injured by the sudden drop in temperature which occurred in December. Some trees were killed outright, but others were injured so that parts have continued to succumb at various times as the season progresses. (Dept. Plant Path.)

MISCELLANEOUS DISEASES AND INJURIES

Armillaria mellea (Vahl) Quel., rootrot, Washington.

Blight reported from Michigan and Kansas, Bacillus amylovorus was isolated from the Kansas material in Kansas. A letter from Bennett of Michigan reports as follows: "Your may be interested to know that we found considerable fireblight on cherry fruits in Michigan this summer. I have isolated the organism and have obtained typical fireblight on apple and pear fruits and on apple twigs, so that I think there is very little doubt but that the cherry spot was caused by Bacillus amylovorus."

Bacterium cerasi Griffin, bacterial gummosis was unusually severe on sweet cherries in Oregon, according to Barss, "The results of this disease seem to be unusually severe this season. In the first place the extreme low temperatures (below zero) of the last Christmas season may have accelerated the canker and girdling activity of the bacteria attacking tree bodies of sweet cherries. In the second place the cool, moist spring seemed to provide an unusual amount of spur blight and leafspotting. These leafspot areas are often large. They frequently drop out and leave a lacy effect on the trees."

Barss (1) says that this disease is the greatest problem in young sweet cherry orchards in Oregon and Washington. Sour cherries are not attacked.

Bacterium pruni EFS., bacterial spot, New York.

Bacterium tumefaciens EFS. & Town., crowngall, Washington.

Cercospora cerasella Sacc., leafspot, Florida.

Cladosporium carpophilum Thuem., scab, Iowa.

Exoascus cerasi (Fckl.) Sadeb., witches' broom, Washington, Oregon.

Podosphaera oxyacanthae (Fr.) D By., powdery mildew, was reported to be more prevalent in New Jersey than usual, causing 5 per cent loss in Iowa, and present, but of no importance, in Connecticut and New York

An undetermined powdery mildew was reported for the first time on cherries in Minnesota. "Powdery mildew stunting Sand cherry and Zumbra cherry in nursery rows at Owatonna. Not on other varieties." (Div. Plant Path.)

Arsenical injury caused considerable loss on Morellos in New York. According to Chupp and Pierstorff the canners served notice on the growers this spring that unless the cherries were sprayed well enough to keep the maggot down to 1 per cent or less the crop would not be accepted. Consequently, many growers used too much arsenic and caused serious injury on ripening Morello fruit. In one large orchard in Niagara County where the grower put on too heavy applications, from 5 to 50 per cent of the fruit on different trees was destroyed. Similar injury was reported from Orleans, Monroe, and Wayne Counties.

Gummosis (Undet.) was reported on Schmidt sweet cherries in Ontario County, New York; and Washington.

Leaf crinkle (cause unknown, probably soil deficiency), Idaho (noted in several orchards in Lewiston region. Leaves have somewhat the appearance of mosaic infected plants).

A physiological trouble of sour cherries in reported by Frank from western Washington as very abundant on Montmorency, less abundant on Morella, in dry seasons. The fruit is glassy, bitter tasting, and may be brown inside. (Dept. Plant Path.)

Tranzschelia punctata (Pers.) Arth., rust, South Carolina.

Recent literature on cherry diseases

1. Barss, H. P. Avoidance of bacterial gummosis of cherry. Better Fruit 19 (7): 7. Jan. 1925.

2. Brown, W. H. The cherry in New South Wales. A discussion of the problems. Agr. Gaz. New South Wales 36: 121-134, 199-208. 1925.

3. Marre, F. Le Botrytis des cerisiers. Jour. Agr. Prat. 43: 17-18. Jan. 3, 1925.

APRICOT

Blight, said to be due to Bacillus amylovorus (Burr.) Trev., was reported from Florida and Texas.

Bacterial spot due to Bacterium pruni EFS. was reported from Texas.

Crowngall due to Bacterium tumefaciens EFS. & Town. caused a loss estimated at 1.5 per cent in Arizona, according to Streets.

Scab caused by Cladosporium carpophilum Thuem. was reported from Texas (loss one-half per cent).

Blight caused by Coryneum beijerinckii Oud. was said by Hungerford to be, as usual, the most important disease of apricots in Idaho. It was general and destructive in California, according to Milbrath, who estimated a loss of 6 per cent.

Rootknot caused by Heterodera radicicola (Greef) Muell., (Caconema radicicola (Greef) Cobb), was reported from Arizona (caused the death of a young apricot tree near Phoenix).

Rootrot caused by Ozonium omnivorum Shear killed about one per cent of the trees in the southern half of Arizona (Streets).

Blossom and twig blight caused by Sclerotinia fructicola Rehm (S. americana (Wormald) Norton & Ezekiel) was an important factor in the Santa Clara, Sacramento, and San Joaquin Valleys of California, according to Milbrath, who estimated a loss of 5 per cent. Rudolph (5) states that the Monilia blossom blight of apricots has become increasingly destructive in California in recent years, due most probably to extensive planting of susceptible varieties. In favorable seasons it may be followed by fruit rot. The Sclerotinia stage is very rare in California. Control is difficult, but may be attained by successive spraying with Bordeaux 8-8-50. Sulfur compounds should not be used, since the apricot is exceedingly liable to sulfur injury.

Green fruit rot caused by Sclerotinia sclerotiorum (Lib.) Mass. caused considerable loss in some orchards in California. The reduction in yield for the state was estimated by Milbrath at one-half per cent.

Black heart caused by Verticillium sp. (? alboatrum Reinke & Berth.) "A considerable factor throughout California; loss .2 per cent. There seems to be some correlation between potato and fruit tree infection by Verticillium." (Milbrath)

Fruit spot (undet.) was reported from Kansas. "Alternaria and Venturia spores in lesions. Looks like scab spots. Lesions brown, sunken, firm at first. Later they become larger, more sunken, and softer." (White)

Recent literature on apricot diseases

1. Anon. Peach blight, shot-hole fungus, and the peach twig borer. Blue Anchor 2 (11): 16, 33. Nov. 1925.

2. Entomologists and plant pathologists of the agricultural experiment stations and colleges of agriculture. Spray calendars for various sections of the country. Amer. Fruit Grower Mag. 45 (2). Feb. 1925.

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4. Nicholls, W. H. Apricot growing. Diseases. Jour. Dept. Agr. Victoria 23: 105-108. Feb. 1925.

5. Rudolph, B. A. Monilia blossom blight (brown rot) of apricots. California Agr. Exp. Sta. Bul. 383: 1-55. Feb. 1925.

6. Smith, R. E., and E. H. Smith. Further studies on Pythiaceous infection of deciduous fruit trees in California. Phytopath. 15: 389-404. 1925.

DISEASES OF SMALL FRUITS

GRAPE

The total grape production in the United States in 1925 was 1,967,160 tons compared to 1,763,742 tons in 1924. The total crop value in 1925 was $66,969,323.00 while that of 1924 was $73,227,580.00. In the order of production the states ranked as follows in 1925, California, New York, Michigan, Ohio, and Pennsylvania.

The survey of the various diseases which have caused economic losses to the grape crop indicates that in 1925 the loss from fungous injury and other causes was considerably below normal.

BLACKROT CAUSED BY GUIGNARDIA BIDWELLII (ELL.) VIALA & RAVAZ

Of the states reporting on blackrot of grapes in 1925 only one reported greater prevalence than in 1924 or normally. This is a very exceptional record for blackrot, which, for a long period of years has been the most important disease of grapes in the eastern United States. Eleven out of eighteen states reported less than average prevalence. The only states from which reports of serious injury were received were Maryland, Kentucky, and South Carolina. The losses reported are given in table 71.

GRAPE - Blackrot

Table 71. Estimated losses from blackrot as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	Maryland	3	Delaware, Alabama
8	Kentucky	2	New Mexico
7	Virginia	1	West Virginia
5	South Carolina, Mississippi, Georgia, Idaho, Texas	.5	Ohio, Illinois, Connecticut
		trace	Arkansas, Wisconsin, Kansas, New York
4	North Carolina		

Dates and location of earliest reported appearance of blackrot, 1925

June 9	Westminster	South Carolina	June 22	Erie County	New York
June 15	Thomas	Georgia	July 12	New Brunswick	New Jersey
June 22	Newark	Delaware	July 21	Westford	Connecticut

Virginia: The only disease of economic importance this season on Muscatine grapes in Tidewater region. (McWhorter)

North Carolina: Less prevalent on account of dry weather. (Fant)

Georgia: Mostly leafspot injury. Only slight injury to fruit reported from southernmost counties. (Dunegan)

Florida: Reported from several widely scattered points in the state. Although the fruit of Muscatine varieties is quite resistant the leaves are quite susceptible. (Dept. Plant Path.)

Louisiana: Some Muscatine grape varieties severely diseased. Others entirely free. (Tims)

Oklahoma: This parasite is unusually destructive this season, especially in the eastern part of the state where as high as 50 per cent of the crop in some of the unsprayed orchards has been destroyed. (Rolfs)

Ohio: Less severe in the state than last year. In fact very little reported. (Young)

Michigan: Little or no loss in most vineyards. Difficult to find any trace of rot in many plantings. (Bennett)

Manns and Adams (2) found that infection may occur any time after the new shoot is one inch long, although the macroscopic lesions may not appear until the fruit is two-thirds or more grown. No number of sprayings can control blackrot after initial infection has taken place. Dry weather may arrest the disease. Primary infection at the base of new shoots is thought to be the means of carrying over infection for the succeeding year.

Recent literature on blackrot:

1. Guba, E. F. Blackrot and mildew of the vine. Amer. Fruit Grower 45 (5): 12. 1925.

2. Manns, T. F., and J. F. Adams. (Report of) Dept. of Pl. Path. and Soil Bacteriology. In Delaware Agr. Exp. Sta. Bul. 139: 24-29. 1925.

DOWNY MILDEW CAUSED BY PLASMOPARA VITICOLA (BERK. & CURT.) BERL. & DETONI

Downy mildew was of considerably less importance this year than in average years, only Minnesota reporting greater than average prevalence. New Hampshire, New York, Delaware, Virginia, Ohio, and Indiana reported downy mildew to be of slight importance. Losses were estimated as follows: Maryland, 2 per cent; Alabama, 1 per cent; Ohio, .5 per cent; Virginia, Kansas, and Arizona, a trace.

Dates and location of earliest reported appearance of downy mildew, 1925

July 4	Madison	Wisconsin	August 12		Maryland
July 7	St. Paul	Minnesota	August 13	Indianapolis	Indiana
July 20	Stratford	Connecticut	August 15	Dover	New Hampshire
July 20	Green County	New Jersey	August 18	Freehold	Delaware

Massachusetts: Widespread but development checked by dry weather. (Osmun & Davis)

New York: Rare on cultivated grapes. Common on wild grapes. (Chupp)

Maryland: The chief cause of premature defoliation of Niagara grapes in at least one vineyard. It was present on practically all of the vines of this variety and as a result of it, many of the leaves were curling, dying, and falling prematurely. (Haskell)

Illinois: Dry weather throughout most of the season reduced mildew. (Anderson & Tehon)

Recent literature

1. Cadoret, A. La bouillie basique bleue contre le mildiou. Compt. Rend. Acad. Agr. France 11: 686-688. July 1925.

2. Guba, E. F. Blackrot and mildews of the vine. Amer. Fruit Grower 45 (5): 12. 1925.

3. Kotte, W. Observations sur la resistance de certains hybrides au mildiou et au roterbrenner. (Observations on the resistance of certain hybrids to mildew and 'roterbrenner'). Prog. Agr. et Vitic. 83: 13-15. 1925.

4. Manuel, H. L. Downy mildew of the grape. Agr. Gaz. New South Wales 36: 751-752. Oct. 1925.

5. Ravaz, L. Chronique: Le temps. - Le mildiou. (Current events: The weather. - Mildew.) Prog. Agr. et Vitic. 83: 581-586. 1925.

POWDERY MILDEW CAUSED BY UNCINULA NECATOR (SCHW.) BURR.

The only state, of the ten reporting the disease, in which powdery mildew was said to be important was California, where a loss of 2 per cent was estimated by Milbrath.

Illinois: Very slight infection. General throughout the state late in season. (Anderson & Tehon)

Michigan: A small amount of mildew is present on the leaves in a few vineyards. Generally rare. (Bennett)

Oregon: Not very important. Probably general with host. Controlled with sulfur-dust. (Barss)

California: An important factor. Continuous dusting saved many crops. (Milbrath)

Recent literature

1. Castle, C. B. Combination tractor and sulfur blower. Amer. Fruit Grow. 45 (3): 22. 1925.

2. Guba, E. F.. Blackrot and mildews of the vine. Amer. Fruit Grow. 45 (5): 12. 1925.

3. Fonzes-Diacon. La lutte contre l'oidium. Progr. Agr. et Vitic. 83: 16-18, 40-42. 1925.

4. Vermorel, V. Le permanganate de potasse contre l'oidium. Prog. Agr. & Vitic. 84: 80-83. July 26, 1925.

ANTHRACNOSE CAUSED BY SPHACELOMA AMPELINUM D BY. (GLOEOSPORIUM AMPELOPHAGUM (PASS.) SACC.)

Anthracnose was reported this year from Delaware, Maryland, Florida, Alabama, Mississippi, Kansas, and Porto Rico.

Delaware: Found overwintering on canes. (Adams)

Florida: Of frequent occurrence throughout the grape growing sections. (Rhoads

Mississippi: Light infection and slight damage. Less than 1 per cent. (Beal)

Kansas: One report only this year. Of very slight importance. (White)

DEADARM CAUSED BY CRYPTOSPORELLA VITICOLA (REDDICK) SHEAR

Deadarm was reported from New York, Delaware, South Carolina, and Kansas. The first appearance noted in New York was on June 12 in Orleans County. In South Carolina it first appeared on July 21, at Waterloo, and in Kansas on June 30, in Doniphan County.

New York: Present in Chautauqua district most commonly. (Chupp & Pierstorff)

South Carolina: Slight to moderate injury locally. In vineyards in Sand Hill and Piedmont regions. (Fenner)

SPRING FROST INJURY

Frost injury as a factor of grape production was very great in 1925. Some of the collaborators statements follow:

Wisconsin: Temperatures were low enough to kill buds and vines. The vines started growth after being killed back by the frost but only a few blossoms came on second growth. (Vaughan)

Illinois: Frost on May 23 and 24 killed back vines to the old wood in many cases. Also killed all the blossoms. New set of blossoms produced 10 per cent of crop. (Anderson & Tehon)

Virginia: Complete killing on higher altitudes. (Fromme)

OTHER DISEASES AND INJURIES

Bacterium tumefaciens EFS. & Town., crowngall, was reported from Florida (found on Alicante Bouschet at Grand Island; also on an unidentified variety at Dade City. - Rhoads), Michigan, New Mexico, Washington, and Oregon.

Botrytis sp., gray mold rot, was important in some sections of Oregon, causing rot of fruit on the vine and after picking. In the vicinity of Grants Pass the loss on Tokays was about 25 per cent. Rains at picking time favored its development. In California also it was much more prevalent than usual and was serious in many localities, especially in the coastal districts, occurring as a blossom rot in the spring and internal cluster rot in the fall.

GRAPE - Other Diseases; Miscellaneous Literature

Clitocybe monadelpha (Morgan) Sacc., according to Rhoads (10) causes a common and sometimes destructive rootrot in the Ozark section of Missouri, and probably in other southern states.

Exosporium sp., Florida.

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb) root knot, California (loss 1.5 per cent).

Isariopsis clavispora (Berk. & Curt.) Sacc., leafspot, South Carolina (unimportant); Florida (causes premature defoliation).

Melanconium fuligineum (Scribner & Viala) Cav., bitter rot, Delaware, Florida.

Ozonium omnivorum Shear, rootrot, Texas, Arizona.

Pestalozzia uvicola Speg., leafblight, Delaware, Florida, Ohio (said by Young to be new to state).

Septobasidium sp., Florida.

Chlorosis (non-par.) Common in Texas (due to excess of lime) and New Mexico.

Mosaic, cause unknown, New York, Westchester County. A mosaic-like trouble affected one plant, which showed mottled leaves, dwarfed growth, and set no fruit, while other plants in the same arbor set fruit abundantly. (Barrus)

Recent literature on grape diseases

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2. Castella, F. de. Vine black spot and erinose. Jour. Dept. Agr. Victoria 23: 432-435. July 1925.

3. Faes, H. Les porte-greffes resistant a la chlorose. Progr. Agr. et Vitic. 83: 83-85. Jan. 25, 1925.

4. Heim, R. Les pourridiés (concl.) IV. Le pourridié des vignes determiné par le Roesleria hypogaea. Traitement Jardinage 12: 328-329. July 1925.

5. Ivanov, B., and P. Patev. Die gefundenden Reben-Krankheiten in Bulgarien. Rev. Inst. Rech. Agron. Bulgarie 3: 2-3, 237-244. 1925. (Germany summary)

6. Pfeiffer, C. Der Grind oder die Mauke, Krebs der Reben. Kranke Pflanze 2: 18-20. 1925.

7. Ravaz, L. Y a-t-il des vignes resistantes au pourridié? Prog. Agric. et Vitic. 42: 173-175. 1925.

8. Ravaz, L. and G. Verge. Sur une maladie de la vigne, l'excoriose. Compt. Rend. Acad. Sci. Paris 180: 313-315. 1925.
   Phoma flaccida associated.

9. Rhoads, Arthur S. The principles and practices in the prevention of grape diseases. Florida Fruits and Flowers 3: 16, 18-20. 1925.

10. Rhoads, A. S. Rootrot of the grapevine in Missouri caused by Clitocybe tabescens (Scop.) Bres. Jour. Agr. Res. 30: 341-364. 1925.

STRAWBERRY

LEAFSPOT CAUSED BY MYCOSPHAERELLA FRAGARIAE (TUL.) LIND.

It is noteworthy that leafspot of strawberries seemed to be considerably above the average in prevalence in 1925. New York and Iowa reported the same prevalence as in 1924, but New Hampshire, Virginia, Connecticut, Louisiana, and Kansas reported more. According to the collaborators, the losses caused were as follows: Kansas, 8 per cent; Iowa, 6 per cent; New York, 1.5 per cent; Texas, 1 per cent.

Dates and location of earliest reported appearance of leafspot, 1925

February 15	Denham Springs	Louisiana	June 22	Green County	New York
May 7	Lawrence County	Indiana	July 15	Portsmouth	New Hampshire
May 8	Neosho	Kansas	October 8	Westport	Connecticut

Vermont: Believe that it is above normal in severity. Have had at least one report where it was really destructive. (Lutman)

New York: Very common and frequently destructive. Most injury when spots appeared on fruit pedicels. (Chupp)

Louisiana: Found quite commonly on plants shipped in from Arkansas. It appeared as early as February 15 and continued to the end of the strawberry season about the last of May. (Edgerton & Tims)

Illinois: Very light on account of dry spring. (Anderson)

Kansas: Unusually severe this season. The frost of May 24 reduced the crop about one-half in this state. This was followed by abundant leafspot infection causing 100 per cent death of plants by June 15 in some cases. If severe weather is experienced this winter it is probable that many large commercial patches will be destroyed due to the weakened condition of the plants. (White)

Varietal susceptibility to leafspot of strawberries was reported as follows by White of Kansas:

Severe infection - Burrill, Magic Gem, Kellog Prize, Cooper.
Moderate infection - Gibbon, Eblong, Dunlap.
Slight infection - Howard, Eaton.
Very slight infection - Kellogg Premier.

LEAFSCORCH CAUSED BY DIPLOCARPON EARLIANA (ELL. & EV.) WOLF

This disease was reported from New York, Delaware, Maryland, Indiana, and California. It was said to be more prevalent in Delaware this year.

According to Horne of California, it occurred on wild strawberries transplanted from Lake Tahoe district. The fungus developed in both places but did not spread to other varieties at Berkeley.

According to Birmingham (1) the control of leafscorch consists mainly in the selection of resistant varieties, the destruction of diseased material, and early spraying with bordeaux mixture.

Recent literature

1. Birmingham, W. W. Leafscorch of strawberry. Agr. Gaz. New South Wales 36: 213-214. Mar. 1925.

STEM NEMATODE, TYLENCHUS DIPSACI (KÜHN) BAST.

According to McKay of Oregon, this is the first year that the nematode disease has been found away from the coast on cultivated strawberries except at Corvallis. The grower who reported it said that about 80 per cent of the plants, in a half-acre of old clover land, were badly affected. Young plants from the same source, planted at the same time on land adjoining this patch, but that had been in oats the previous year, had only 3 per cent infection. It is not known definitely whether the clover strain goes to the strawberry or vice versa, but there is some evidence to the effect that it does.

ROOTROTS DUE TO VARIOUS FACTORS

Maine, Massachusetts, Connecticut, New York, Florida, Louisiana, Illinois, Wisconsin, and Colorado reported rootrot.

Florida: Rootrot has been the most troublesome and destructive disease during the past season in strawberry plants in Florida. It has been reported from practically every strawberry growing region and the losses from this disease in many instances have been considerable. In most cases the diseased plants yielded a Fusarium. There may be other associated organisms that may be important. (Rhoads)

Massachusetts: Instances of 10 to 20 per cent loss of plants due to rootrot. (Osmun & Doran)

New York: Important in some soils. Rootrot follows any weakening of the plant. In one field in Nassau County the loss will probably be 90 per cent of the crop. (Chupp)

OTHER DISEASES AND INJURIES

Botrytis rot was reported from Delaware, Virginia, Arkansas, Indiana, Oregon, California, and Connecticut. Barss reported that in Oregon it was very serious this year due to wet weather throughout the spring picking season. A loss of 4 per cent was estimated by Milbrath in California.

Dendrophoma obscurans (Ell. & Ev.) H. W. Anderson, leaf blotch, New York, Indiana, and Florida. According to the annual report of Florida it was found for the first time in that state in two widely separated sections. This is the first report from New York, also (specimen in Pathological Collections).

Phytophthora sp., Arkansas. Rot, apparently caused by Phytophthora is present to a limited extent. Dry weather appears not to have favored rot in the field. (Dept. Plant Path.)

Rhizopus nigricans Ehr., leak, Indiana, Virginia.

Sclerotinia sclerotiorum (Lib.) Mass., Florida (scattered, not important).

Sphaerotheca humuli (DC.) Burr, powdery mildew, New York, Maine.

Chlorosis caused by too much lime was reported from Texas. In Idaho a chlorosis of unknown cause was very important yellowing the leaves, rotting the crowns, and killing the plants. It was very important in southern Idaho on strawberries, under irrigation.

Mosaic (undet.) Reported from New York and Canada.

Yellows (undet.) Wisconsin (Aroma badly yellowed. Other varieties adjacent not diseased), Minnesota (moderately abundant on some varieties), Oregon (present in western Oregon and possibly widely distributed).

Recent literature on strawberry diseases

1. Beaumont, A. Strawberry diseases in Devon and Cornwall. Ann. Rept. Dept. Plant Path. Seale-Hayne Agr. Coll. 1 (1923-1924): 12-16. 1925?

2. Chifflot, J. Maladies cryptogamiques attaquant les fraisiers. Rev. Hort. Algerie 29: 113-116. June 1925.

3. Richards, B. L. Plant Pathology. In Utah Agr. Exp. Sta. Bul. 192 (Bienn. Rept. Director 1923-24): 58-61. 1925.

4. Stevens, N. E. Strawberry diseases. U. S. Dept. Agr. Farm. Bull. 1458: 1-10. Aug. 1925.

RASPBERRY

ANTHRACNOSE CAUSED BY PLECTODISCELLA VENETA (SPEG.) BURK.

This disease, which has been reported chiefly from sections east of the Mississippi River, is one of the most important raspberry diseases of the eastern part of the United States. Of the twenty-one states reporting it in 1925, none reported more than usual, while in Illinois there was said to be much less, and in West Virginia, Kentucky, and Michigan less than usual. However, as will be seen from the loss estimates given in table 72, and from the quotations following, the disease was of very considerable importance.

Table 72. Estimated losses from anthracnose as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
25	Arkansas	3	Minnesota
20	Pennsylvania	2.5	New York
10	Wisconsin, Kansas	1	West Virginia, Illinois, Michigan, North Dakota
8	Iowa, Indiana		
7	Maryland	trace	Virginia

Dates and location of earliest reported appearance of anthracnose, 1925

May 19	Atlantic	New Jersey	July 9	Conway	New Hampshire
June 1		Pennsylvania	July 14	Branford	Connecticut
June 22	Erie	New York			

Massachusetts: Rarely seen in the last two years. (Osmun & Davis)

Connecticut: Serious on black varieties Eldorado and Plum Farmer. (Clinton)

New York (Erie County): Considerable anthracnose on purples and blacks was found. Some fields have as high as 95 per cent infection. (Taylor)

Pennsylvania: Bad all over state. Lesions on canes, petioles, leaves, and fruit. We have demonstrated conclusively that it can be controlled by thorough spraying. (Krout)

Arkansas: Very important all over state. Very little attempt at control. (Dept. Plant Path.)

Indiana: Limiting factor in commercial plantings. Delayed dormant spray of lime-sulfur 1-10 controls. Dietz reports disease is being controlled in nurseries by the spray. (Gardner)

Illinois: Very slight since light infection on canes did not reduce vitality. General, but worse in northern section of the state. Very dry in spring. On black raspberries. (Anderson & Tehon)

Wisconsin: Major disease, especially in blackcaps. More on red raspberry than ever before. Rapid spread to blackcaps early in the spring. Killing canes. (Vaughan)

Minnesota: Important with some varieties. Of the red varieties, Sunbeam and Ohta apparently very susceptible. A two-acre planting of Sunbeam ruined by anthracnose. (Div. Plant Path.)

Kansas: Twenty to fifty per cent cane infection; up to 100 per cent leaf infection. (White)

Oregon: Not a limiting factor on cane fruits in Oregon. Climatic conditions apparently unfavorable. Occurs on blackcaps to a very limited extent. (Zeller)

According to Baker (1), in the past ten years some states have reported a decrease in acreage as great as 80 per cent, due to anthracnose, while others report annual losses of 25 to 50 per cent of the crop. The only sure way to control disease is by careful and thorough spraying.

Burkholder (2) reports the delayed dormant spray alone if thoroughly applied, will hold the disease in check, provided that spraying is started not later than the spring of the second growing season.

Wilcox (3) discusses the risk of injuring the plants in following the spray methods ordinarily recommended at present.

Recent literature

1. Baker, C. E. Raspberry anthracnose and its control. Better Crops 4: 10-11, 43. Mar. 1925.

2. Burkholder, C. L. Raspberry anthracnose preventives. American Fruit Grower 45 (4): 16. 1925.

3. Wilcox, R. B. The spraying of black raspberries. American Fruit Grower 45 (2): 4, 20, 23. 1925.

CROWNGALL CAUSED BY BACTERIUM TUMEFACIENS EFS. & TOWN.

Crowngall was reported to be of slight importance in West Virginia, Massachusetts, and New Mexico, but of considerable importance in Michigan, Minnesota, Iowa, and Washington. Six states reported loss estimates as follows: Michigan, 10 per cent; Iowa, 6 per cent; Pennsylvania and Kansas, 3 per cent; Minnesota and New Mexico, 2 per cent.

New York: Crowngall found mostly on La France variety in Westchester County. (Chupp & Pierstorff)

Pennsylvania: We are eliminating this disease from new patches by using plants from our rogued plantations. It is decreasing in Pennsylvania. (Krout)

Ohio: At present crowngall is not a serious problem of raspberry growers in Ohio. Raspberry plants grown in Ohio seem to be generally free from galls. Where fields are found heavily infested the plants have as a rule been purchased in other states. (Rept. Plant Pathologists, Northern Ohio Exp. Sta.)

Indiana: Mostly on red raspberry. Found also on purple and black raspberry this season. (Gardner)

Michigan: Statewide, but most severe in Berrien County. (Bennett)

RASPBERRY - Crowngall; Leafcurl; Mosaic

Wisconsin: Major disease in many orchard nurseries. (Vaughan)

Minnesota: About 75 per cent in new planting on soil previously planted to badly galled rose bushes. Plants from same stock but on other soil have only a trace of gall. (Div. Plant Path.)

Washington: The crowngall situation is important. Badly infected seedlings have apparently recovered. (Heald)

LEAFCURL (UNDET.)

Leafcurl of raspberries was reported to be serious in Indiana on blackcaps, but of slight importance in Ohio and New Mexico. The losses reported were: Pennsylvania, 5 per cent; Maryland and Michigan, 3 per cent; North Dakota, 2 per cent; Iowa, trace.

Dates and location of earliest reported appearance of leafcurl, 1925

June 1	New Castle	Pennsylvania	June 24		Indiana
June 15	Warrens	Wisconsin	July 14	Meriden	Connecticut

New York: Almost all of the berries in the Brandt section of Erie County are affected with leafcurl. (Taylor)

Pennsylvania: Occurs in Pennsylvania only on the reds and purples. It is not of common occurrence. (Krout)

Michigan: Cumberland and Cuthbert only commercial varieties affected. (Bennett)

Wisconsin: Practically wiped out on nursery planting stock. (Vaughan)

Minnesota: Minnesota No. 2 apparently quite subject, 20 per cent in one planting. Marlborough and Cuthbert susceptible. (Sect. Plant Path.)

The relation of insects to the transmission of raspberry leafcurl is discussed by Smith (1). His conclusions are:

"1. Aphis rubiphila, Patch, was the only insect carrier of raspberry leafcurl among several insects used. 2. The aphids must feed upon a diseased plant before becoming a carrier. 3. The infective agent is not carried over winter within the egg from the fall generation to the spring forms. 4. The infective agent is not inherited by the offspring in viviparous repoduction. 5. Leafcurl was transmitted from black to red raspberries but not from red to black varieties."

MOSAIC (UNDET.)

The losses reported as due to mosaic of raspberry were comparatively high. Pennsylvania estimated 50 per cent; New York and Minnesota, 15 per cent; Michigan,

12 per cent; Iowa, 8 per cent; Maryland, 2 per cent; and California, .5 per cent. In New York, according to Chupp, "Mosaic is the most serious disease of redcaps." The disease was reported to be on the increase in Massachusetts and very important in Michigan.

Dates and location of earliest reported appearance of mosaic, 1925

May 19	Atlantic	New Jersey	July 2	Orange	Connecticut
June 1	Greene County	New York	July 12	Durham	New Hampshire
June 1		Pennsylvania			

Connecticut: Found on June, Cuthbert (bad), Perfection, St. Regis, Latham, Columbian, and Winfield. (Clinton & Hunt)

Pennsylvania: Columbian probably somewhat resistant. Roguing, which has been practiced in Pennsylvania for three years, has given very good results. We have for distribution this year 200,000 disease-free plants. (Krout)

New Jersey: Symptoms masked by high temperatures in early summer. (Martin)

Ohio: One of the limiting factors of growing raspberries in this state. (Young)

Wisconsin: Major trouble with red raspberries. Fifty-four nurseries could not be issued general certificates because of infection in Latham and King. (Vaughan)

Minnesota: Latham generally affected. Only thirty-two certified plantings in the state. By roguing, selection, and isolation, the amount of clean propagative stock has increased. Sunbeam and St. Regis apparently resistant, but they are of minor commercial importance. (Sect. Plant Path.)

According to Stakman (2), mosaic is very common on wild raspberries in northern Minnesota and Canada. The varieties Marlboro, Cuthbert, Redpath, and King are quite susceptible, while Latham is generally infected but yields well in spite of the disease. Herbert, Sunbeam, St. Regis, Columbian, Donoborough, Ranere and several others seem to be fairly resistant, especially if not grown near susceptible varieties.

Wilcox (3) reported that:

"Certain types of raspberry mosaic are masked during hot weather. Mottled leaves formed during cool weather retain their mottling, but new leaves developed during hot weather appear normal.......

"Rubus innominatus, infected with one type of transmissible mosaic, was found to be not only peculiarly sensitive to temperature changes, but recorded these changes by very conspicuous leaf markings. Such infected canes, accompanied by a record of their growth during the summer, showed correlation between the appearance of seemingly healthy leaves and the occurrence of periods of high maximum temperatures. Study of this relationship indicates that for the mosaic of Rubus innominatus the critical temperature is approximately 75°F. (24°C.)"

STREAK (UNDET.)

Raspberry streak was reported from Connecticut and Oregon. From the latter state Zeller reports, "The disease is confined to two plantings of the blackcap variety Cumberland at Gresham; and causes very slight injury; although the percentage of infection is very high. Streaking on the canes is masked at low temperatures. Leaf mottling appears during cool weather of spring."

Recent literature

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2. Stakman, E. C. Raspberry mosaic. Minnesota Horticulturist 53: 85-87. 1925.

3. Wilcox, R. B. Observations on masking of raspberry mosaic by high temperature. (Abstract) Phytopath. 16: 80. Jan. 1926.

LEAFSPOT CAUSED BY MYCOSPHAERELLA RUBI ROARK (SEPTORIA RUBI WEST.)

Leafspot of raspberry was reported from Maine, New York, New Jersey, Illinois, Iowa, Kansas, and California. In California it caused a loss estimated at 8 per cent, while in Iowa, the loss reported was 3 per cent.

Illinois: An unusually early outbreak of leafspot was noted at Quincy, Illinois, on May 5. The spots were well formed and a few pycnidia could be found at that time. (H. W. Anderson)

Kansas: Important this year. Lesions on canes and buds killed on severely infected canes. The disease caused early defoliation. (White)

California: Very serious in the state this year. (Milbrath)

Porto Rico: Apparently was brought in on plants from Florida. (Cook)

SPURBLIGHT CAUSED BY MYCOSPHAERELLA RUBINA (PK.) JACZ.

Spurblight was reported from New York, Wisconsin, Minnesota, North Dakota, and Oregon. In Wisconsin, Minnesota, and North Dakota it was one of the most important raspberry diseases.

New York: Fairly common but seldom serious. (Chupp & Pierstorff)

Wisconsin: Very general. One of the major troubles of red raspberries. (Vaughan)

Minnesota: In some plantings it was apparently correlated with winter injury. Estimated loss 2 per cent. Ohta generally free. King and Latham usually infected, probably less in Latham than in King plantings. (Sect. Plant Path.)

Oregon: Very bad in the Ashland district; some damage following winter injury in the Willamette Valley. It occurs throughout western Oregon, but the only district where it is really serious is the Ashland district of southern Oregon. There is some indication that drouth or other unfavorable weather conditions during the year the canes make their growth favor the development of this fungus the succeeding year. It occurred especially on red raspberry, but often on winter-injured blackcaps. Spraying with Bordeaux 3-3-50 when canes are from 4 to 8 inches high, 15 to 18 inches, and 36 inches, has given rather satisfactory results, although the first two applications are all that are really necessary. Cuthbert is the only variety grown commercially. (Zeller)

SPRING FROST INJURY

The losses reported as a result of frost injury this year were as follows: Minnesota, 30 per cent; Michigan, 10 per cent; Iowa, 6 per cent; Maryland, 5 per cent.

Wisconsin: Frost injury found even on the so-called winter-proof Latham. (Vaughan)

Minnesota: Latham, which is ordinarily winter-hard, badly affected, especially on low rich soil. Sunbeam and Ohta apparently are winter-hardy. (Div. Plant Path.)

South Dakota: Although there was much damage to other fruits the raspberry escaped. (Evans)

OTHER DISEASES AND INJURIES

Armillaria mellea (Vahl.) Quel., rootrot, Washington. (Frank)

Ascospora ruborum (Oud.) Zeller (5), leafspot, reported from Washington and Oregon. Zeller stated that, "This is the commonest fungus in western Oregon but it is questionable how much damage it does. It prevents winter-injured plants from recovering when they might otherwise produce a good crop."

Botrytis sp., gray mold rot, Connecticut (one report), New York (seen occasionally), and Washington. In Washington it was probably the cause of blight of the newly formed fruit according to Arthur Frank.

Cercospora sp., leafspot, Florida.

Gymnoconia interstitialis (Schl.) Lagh., orange rust, Michigan and Wisconsin. See blackberry.

Phragmidium imitans Arth., leaf rust, Washington, Oregon. According to Zeller of Oregon, "This rust is very prevalent this year causing the usual leaf lesion but the serious phase of the disease is the cane lesion produced at the base causing a brittleness." In Washington it is prevalent in the Puget Sound region.

Phyllosticta sp., leafspot, Florida.

Sphaerotheca humuli (DC.) Burr., A powdery mildew, probably this species, was reported from Oregon. According to Zeller it is limited to the Munger variety, on which it is very serious, affecting canes as well as leaves. An undetermined powdery mildew occurred on red varieties in Indiana.

Verticillium albo-atrum Reinke & Berth., bluestem, wilt (4, 6, 7). Very destructive on black raspberries in New York, according to Chupp and Pierstorff. Also reported from Ohio and Washington.

Bacterial blight (undet.) reported from Washington causing a twig blight on the variety Antwerp. (Frank)

Recent literature on raspberry diseases

1. Atwood, G. G. Raspberry diseases and control measures. Circ. Dept. Farms & Markets, New York 280: 11 p. 1925.

2. Colby, A. S. The raspberry disease situation in Illinois. News Letter Illinois State Hort. Soc. 1925 (4). May 10, 1925.

3. Frank, A. 1924 information on winter injury, mosaic and other diseases of raspberries in western Washington. Proc. Washington State Hort. Assoc. 2: 128-135. 1925.

4. Harris, R. V. The blue stripe wilt of the raspberry. Jour. Pomol. & Hort. Sci. 4: 221-229. June 1925.

5. Zeller, S. M. Coryneum ruborum Oud. and its ascogenous stage. Mycologia 17: 33-41. Jan.-Feb. 1925.

6. __________ A case of Verticillium wilt (blue stem) (V. alboatrum) of black raspberry in Oregon. (Abstract) Phytopath. 15: 125-126. 1925.

7. Zundel, G. L. Why raspberries "run out". West. Fruit 7 (4): 7. Apr. 1925.

BLACKBERRY

ORANGE RUST CAUSED BY GYMNOCONIA INTERSTITIALIS (SCHL.) LAGH. AND KUNKELIA NITENS (SCHW.) ARTH.

Of the 17 states reporting on orange rust of blackberry not one indicated greater prevalence of this disease than last year or in normal years. Arkansas reported it to be very important and in Wisconsin it was the major disease.

Table 73. Estimated losses from orange rust as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
5	Arkansas, Iowa	.5	Pennsylvania
2	Michigan	trace	New York
1	West Virginia, Maryland		

Dates and location of earliest reported appearance of orange rust, 1925

April 11	Calhoun	South Carolina	June 8	Greene County	New Jersey
April 12	Raleigh	North Carolina	June 21	Plymouth	Connecticut
April 15	Middlesex	Pennsylvania	July 6	Hillsboro	New Hampshire
May 7	Orange County	Indiana			

Pennsylvania: This disease is not very common on the blackberry where the patch is well cared for. (Krout)

Florida: Very severe on blackberries in this state. (Dept. Plant Path.)

Michigan: More destructive on black raspberry than on blackberry. (Bennett)

Wisconsin: Major importance this year. Noted considerable on red raspberries in La Crosse and Washakie Counties. Came late, after September 1. (Vaughan)

ANTHRACNOSE CAUSED BY PLECTODISCELLA VENETA (SPEG.) BURK.

Anthracnose of blackberry was of slight importance in 1925 according to the reports submitted. Arkansas and Iowa reported losses of 1 per cent.

Pennsylvania: Only a trace (less than one-eigth of 1 per cent) of this disease can be found on plantations well cared for. (Krout)

Florida: Well distributed over the state and is doing considerable damage. (Dept. Plant Path.)

Oklahoma: Causing considerable loss especially in plantations where the plants were weakened by adverse weather and soil conditions. (Rolfs)

OTHER DISEASES AND INJURIES

Bacterium tumefaciens EFS. & Town., crowngall, New York (on wild blackberry), Florida, Washington.

Botrytis fruit rot, Massachusetts. "Rotting of ripened berries common with considerable damage. A Botrytis is most frequently isolated but Rhizopus and Penicillium also present." (Davis)

Cephaleuros virescens Kze., algal leafspot, Florida.

Cercospora rubi Sacc., blotch, Florida, Louisiana (common).

Fusisporium rubi Wint., double blossom, Delaware, Florida. According to Adams of Delaware, this is the first infection observed in a commercial planting in Delaware. In Florida it was reported several times from various sections of the state doing considerable damage.

Mycosphaerella rubi Roark, leafspot, reported from New Jersey (not important), Florida (occasional), Louisiana (common), Texas (prevalent), Indiana (same), and Iowa (unimportant).

Canker (undet.) An undetermined canker associated with Coryneum and Phomopsis was observed in Washington.

Dwarf disease (virus), reported from Oregon by Zeller (1), "Causes dwarfing of canes and stubbiness of ends of canes similar to streak, but no streaking of canes. As far as known, this disease occurs only on the Pacific coast. The most susceptible host is Phenomenal blackberry, which should not be planted. Have never seen a planting of this variety, or one containing this variety, that did not have some dwarf. Transmitted to loganberries wherever they are planted with Phenomenal."

Frost injury, Michigan reported 3 per cent loss. In Wisconsin frost injury was a major trouble while in Illinois, according to Anderson, blackberries were damaged more seriously by the frost of May 23, than were raspberries.

Mosaic (undet.) A mottled appearance of leaves observed at Middlesex, New Jersey, August 16.

Recent literature on blackberry diseases

1. Zeller, S. M. Some facts about loganberry "dwarf". (Abstract) Phytopath. 15: 125. Feb. 1925.

DEWBERRY

Anthracnose caused by Plectodiscella veneta (Speg.) Burk. was reported from New York and South Carolina. According to Fenner of South Carolina, "Anthracnose was important but not serious. It occurred in local areas of the Sand Hill and Coastal Plain regions, wherever the crop was grown. New growth became infected from old canes which remained uncut. Bordeaux sprays have controlled the disease."

Dutton (1) recommends, as a result of three years' experiments on the control of dewberry anthracnose, a delayed dormant application of lime-sulfur 5-100 with the addition of one pound of calcium caseinate, to be followed about a week before blooming by an application of Bordeaux mixture 4-8-100.

Leafspot caused by Mycosphaerella rubi Roark, Delaware (generally prevalent in commercial plantings).

Orange rust caused by Gymnoconia interstitialis (Schl.) Lagh., reported from Dutchess County, New York.

Recent literature on dewberry diseases

1. Dutton, W. C. Spraying dewberries for anthracnose. Mich. Sta. Spec. Bul. 144: 3-13. 1925.

2. Matthews, C. D. Dewberry growing. Amer. Fruit Grow. Mag. 45 (6): 5, 14-15. June 1925.
Two most serious troubles are anthracnose and double blossom.

LOGANBERRY

Anthracnose caused by Plectodiscella veneta (Speg.) Burk. was reported from Washington.

Crowngall caused by Bacterium tumefaciens EFS. & Town. was reported from Washington.

Dwarf (virus) (1) was reported by Zeller from western Oregon, "Keeping out Phenomenal blackberry, which is always affected, and roguing give effective control. Quite common but can probably be controlled."

Leafspot caused by Mycosphaerella rubi Roark. According to Zeller, this leafspot is very common in Oregon, but is easily controlled by Bordeaux sprays.

Mosaic (undet.) was reported from Washington.

Spur blight caused by Mycosphaerella rubina (Pk.) Jacq., leafspot, Oregon (limited to winter injured plants causing what the growers call gray bark).

Winter injury. Regarding winter injury in Oregon S. M. Zeller of Oregon wrote:

> "In the Willamette Valley about 60 per cent of the canes were killed outright and the 40 per cent remaining had a very favorable spring with cool weather and intermittent rainfall until the second or third week in June. However, this favorable weather was conducive to the production of large leaf surface and a large set of fruit on fruiting canes and an abundance of new cane growth, thus with the hot weather late in June, approximately a 40 per cent loss in the berries set was brought about two conditions: (1) The partially winter injured canes could not supply sufficient moisture to the developing fruits which died before maturity. (2) Ripe and partially ripe berries were sunburned."

Recent literature

1. Zeller, S. M. Some facts about loganberry "dwarf". (Abstract) Phytopath. 15: 125. 1925.

CURRANT

Leafspot caused by Mycosphaerella grossulariae (Fr.) Lind., New York (statewide, less than usual).

Anthracnose caused by Pseudopeziza ribis Kleb., New Jersey (unimportant), Oregon (general with host).

Rust caused by Puccinia grossulariae (Schum.) Lagh., Winnepeg, Canada.

Blister rust caused by Cronartium ribicola Fisch., (See white pine, Supplement 48).

Powdery mildew caused by Sphaerotheca mors-uvae (Schw.) Burk. & Curt., Washington and Manitoba, Canada (rather injurious this year).

Scald (high temperature), New York.

Reversion disease (undet.) An interesting article by A. H. Lees on means of infection with the reversion disease of black currants appeared (2).

Recent literature

1. Anon. Reversion disease of black currants. Big bud. Fruit, Flower and Veg. Trades Journ. 47: 670-671. June 1925.

2. Lees, A. H. Reversion disease of black currants: Means of infection. Ann. Appl. Biol. 12: 199-210. May 1925.

GOOSEBERRY

Anthracnose caused by Psuedopeziza ribis Kleb., was reported from New Jersey, Indiana, and Oregon. In the Willamette Valley of Oregon, according to Barss, much more than normal was reported and a loss of 10 per cent was estimated. Serious defoliation occurred in many cases, with resulting damage to the vitality of the bushes which will probably affect next year's crop.

Powdery mildew caused by Sphaerotheca mors-uvae (Schw.) Berk. & Curt., Wisconsin, Washington, Oregon.

Rust caused by Puccinia grossulariae (Schum.) Lagh. was reported to have caused a 2 per cent loss in Iowa.

Die-back, Botrytis sp., Washington.

Recent literature

1. Colby, A. S. Control of the leafspots on gooseberries. Amer. Fruit Grow. Mag. 45 (7): 24. 1925.

2. Dietrich, O. Bekämpfung des amerikanischen Stachelbeermehltaues. (Control of American gooseberry mildew). Deut. Obst- u. Gemuseb.-Zeit. 71: 80-81. Feb. 13, 1925.

3. Hahn. Die Winterbehandlung des Stachelbeermehltaues. (The dormant treatment of gooseberry mildew). Gartenw. 29: 188-190. 1925.

CRANBERRY

Blight, more of this trouble occurred in Wisconsin this year than usual, according to S. B. Fracker. He reported that seventy-five per cent of fruit stopped development at pin-head size.

False blossom. According to Stevens (4) observations on false blossom of cranberry seem to indicate that this trouble is infectious. It is thought that false blossom was not due entirely to poor cultural conditions because it often occurs in well-drained and well-cultivated bogs. The author suggests that until the cause of the disease has been definitely determined it is unwise to plant vines from bogs where the disease occurs. According to S. B. Fracker, this disease seems to be increasing slowly in Wisconsin where it was slightly more prevalent than usual. Aside from the frost this is considered a major trouble in cranberry production in that state. Apparently a temporary improvement is induced by holding winter flood until July 1. It was found on 48 of 61 marshes examined, and for the first time in history in three wild bogs.

Cranberry Diseases in Washington and Oregon

The following report was submitted on cranberry diseases in Washington and Oregon in 1925 by H. F. Bain, of the Office of Fruit Disease Investigations, United States Department of Agriculture:

> "The 1925 cranberry crop in the Pacific Coast region was the largest on record, chiefly due to the uniformly good yield on most of the Washington bogs. As in past years, very little field loss was caused by fungi. Hard-rot or cotton-ball, caused by Sclerotinia oxycocci Wor., was present in a few bogs, but on the whole this disease was less abundant than usual. Such vine diseases as rose-bloom (Exobasidium oxycocci Rost.), red leaf-spot (E. vaccinii (Fckl.) Wor.) and black stem spot (caused by an undescribed fungus) were also less abundant than in an average year.
>
> "The berries kept well in storage, in contrast to the experiences of some years. The usual species of fungi were found in culture made from berries which rotted in storage. In a series of 750 such cultures, the end-rot organism (Fusicoccum putrefaciens Shear) developed in 63 per cent, Penicillium sp. in 13 per cent, and Phomopsis sp. in 4 per cent of the cultures. Other fungi which occurred less frequently were Botrytis sp., Ceuthospora lunata Shear, Sporonema oxycocci Shear, and Sporonema pulvinatum Shear."

Disease Control by Airplane Dusting

An interesting possibility in the control of cranberry diseases by dusting from airplanes has been reported (U. S. Dept. Agr. Official Record 4 (51): 6. Dec. 23, 1925).

> "The airplane dusting of cranberry bogs undertaken at Pemberton, New Jersey, during the annual meeting of the American Cranberry Growers' Association, August 26, 1925, was little more than a demonstration of the practicability of so handling an airplane as to give satisfactory distribution of the dust on cranberries.
>
> "That copper lime dust will greatly reduce the fruit rots of cranberries has been proven by three years' work with hand dusting machines in Massachusetts. The airplane apparatus at Pemberton indicated that a fairly satisfactory application of dust may be obtained by airplane.
>
> "If practicable, airplane dusting offers certain advantages in addition to the speed of the operation over any other known means of applying fungicides to cranberry bogs. In cultivated bogs the cranberry vines

cover the ground completely like the grass in a well-kept yard. Ordinary spraying or dusting operations necessitate a certain amount of trampling which is generally believed to be injurious.

"One difficulty encountered in arranging for the demonstration at Pemberton was to find a bog having a satisfactory landing place near by. Few cranberry bogs are located near large open fields. Most large bogs have, however, good-sized reservoirs or ponds near by, and it has been suggested that a hydroplane should be used for dusting cranberry bogs."

Recent literature on cranberry diseases

1. Anon. Aeroplane wins friends among cranberry growers. New Jersey Agriculture 7 (10): 13, 15. Oct. 1925.

2. Beckwith, C. S. Cranberry disease work in New Jersey. Proc. Amer. Cranberry Grow. Assoc. 55: 11. 1925.

3. Morse, S. F. Airplane dusting for cranberry pest control. Proc. Amer. Cranberry Grow. Assoc. 56: 4-5, 8. 1925.

4. Stevens, Neil E. Field observations on false blossom of the cultivated cranberry. Phytopath. 15: 85-91. 1925.

5. ________________ Notes on blueberry and cranberry diseases. Proc. Amer. Cranberry Growers Assoc. 55: 7, 10. 1925.

BLUEBERRY

Leafspot caused by *Phyllosticta* sp., reported from Palm Beach County, Florida, July 7.

Stem rust caused by *Calyptospora columnaris* (Alb. & Schw.) Kuehn was reported from Minnesota where it is said to be fairly common in the northeastern part of the state.

Recent literature

1. Stevens, Neil E. Notes on blueberry and cranberry diseases. Proc. Amer. Cranberry Growers Assoc. 55: 7, 10. 1925.

MULBERRY

Texas rootrot caused by *Ozonium omnivorum* Shear was reported as prevalent on mulberries growing in the black lands of Texas.

Popcorn disease caused by *Sclerotinia carunculoides* Siegler & Jenkins was reported with specimens from Telfair County, Georgia, by O. C. Boyd and from Alabama by W. L. Blain.

DISEASES OF SUB-TROPICAL FRUITS

Prepared by H. R. Fulton

CITRUS FRUITS

Diseases Caused by or Attributed to Parasites

CITRUS CANKER CAUSED BY BACTERIUM CITRI (HASSE) JEHLE

Citrus canker was reported to be common on oranges in the Bayou Lafourche district of Louisiana (Edgerton). In Florida five infected trees were discovered March, 1925, at Boynton. They were all destroyed. No canker was observed in Alabama or Texas, according to collaborators.

CITRUS BLAST CAUSED BY BACTERIUM CITRAREFACIENS LEE (PSEUDOMONAS CITRIPUTEALE)

California: Prevalence about the same as usual; causes death of leaves, of areas surrounding leaf scars, and of some twigs; occurs in northern California; usually worst in March and April; sweet orange susceptible, lemon a little less so. (Fawcett)

MELANOSE CAUSED BY PHOMOPSIS CITRI FAWCETT

Melanose was reported to be present but unimportant in Alabama and Louisiana. The following reports were received from Florida and Arizona.

Florida: Severe this season as a result of considerable rain occurring before the fruit reached the immune state. Excellent control was secured with Bordeaux-oil emulsion. (Rhoads)

Less severe than usual. About 75 per cent of the citrus plantings more or less severely infested. One application of Bordeaux-oil emulsion made in late April or early May gives good control. (Winston)

Arizona: On leaves of sweet seedling orange, Pima County. Probably first report from state. (Streets)

CITRUS STEM END ROT CAUSED BY PHOMOPSIS CITRI FAWCETT AND DIPLODIA NATALENSIS EV. AND OTHER FUNGI

In Alabama and Louisiana stem end rot was said to be of slight importance. Other reports received are as follows:

Florida: About as prevalent as usual. (Rhoads)
More than usual. More prevalent in groves during the fall than has been the case since 1918. (Winston)

California: Stem end rot caused by *Diplodia* sp. and by *Dothiorella ribis* was of minor importance in long storage of fruit from coastal sections. *Phomopsis californica* was less prevalent than last year, and was probably of minor importance, except on storage lemons. (Fawcett)

Porto Rico: Common, causing losses in shipment. (Cook & Tucker)

CITRUS SCAB CAUSED BY SPHACELOMA SP. (S. FAWCETTI JENKINS; SPOROTRICHUM CITRI BUTLER)

Florida: More severe than usual in some sections when weather conditions favored development. (Rhoads)
About the same as usual, of major importance in low damp situations. About 75 per cent of grapefruit plantings more or less infested. A late dormant application of Bordeaux-oil emulsion gives better control than any other time. (Winston)

Alabama: Same as usual; controlled by spraying. (Miles & Blain)
Serious on satsuma oranges where not controlled by Bordeaux mixture applied to the very young fruit, beginning with petal drop. (Fulton)

Louisiana: Common in satsuma oranges, as usual. (Edgerton)

Texas: Unimportant, traces. (Taubenhaus)

Porto Rico: Abundant, the most important citrus disease on the island; good results from use of Bordeaux mixture. (Cook & Tucker)

BLUE MOLD AND GREEN MOLD ROTS CAUSED BY PENICILLIUM ITALICUM WEHMER AND P. DIGITATUM (FR.) SACC.

Penicillium rot was reported by Fulton to be of very slight importance in Alabama, while Cook and Tucker said that it was common in Porto Rico. Reports from Florida and California are as follows:

Florida: This form of decay is far more prevalent than in recent years, especially during the fall and early winter; excessive rains aggravated the trouble, but it also seems that the fruit was unusually tender; borax has not given as much control as was expected. (Winston)

California: Both types of rot common everywhere; borax wash has effectively controlled the common green mold (P. digitatum) but has not been entirely successful against the blue contact mold (P. italicum). (Fawcett)

ANTHRACNOSE AND CITRUS WITHERTIP ATTRIBUTED TO COLLETOTRICHUM GLOEOSPORIOIDES PENZ.

Anthracnose was reported to be of minor importance. Besides the statements quoted below, reports were received from Louisiana, Texas, and Porto Rico, where it is sometimes severe, according to Cook and Tucker.

Florida: Usual occurrence; of minor importance; probably not a real disease, but a manifestation following root drowning, starvation, frost injury, drouth, etc. (Winston).

Common and widespread throughout the citrus section of the state but no more severe than usual and cannot be considered major diseases. Withertip is inclined to develop most abundantly on trees whose vitality has been greatly reduced for any reason, especially from drought. Anthracnose caused some damage to fruit locally. (Rhoads)

Alabama: Not important. (Miles & Blain)

Occurs as slow fruit rot of satsuma oranges in long storage. (Fulton)

California: Usually a minor trouble characterized by spotting or slow rotting of fruits. (Fawcett)

FOOTROT ATTRIBUTED TO PHYPHTHORA TERRESTRIS SHERB.

Florida: Usual prevalence; banking with clay to induce root formation above girdled base seems to have given good results in one instance. (Rhoads)

Of major importance on seedling orange and grapefruit trees; sweet orange, rough lemon, grapefruit and sour orange stocks are increasingly resistant in the order given; aeration of the crown gives good results, especially when roots are painted with a bluestone paste. (Winston)

Texas: Same as usual; only a few trees affected and progress of the disease is slow; cleaning and painting with Bordeaux successful. (Alsmeyer)

FRUIT ROTS CAUSED BY VARIOUS ORGANISMS

Black rot caused by Alternaria citri Pierce, Florida, "Of occasional occurrence usually as blossom end rot." (Fulton); Alabama, "On satsuma oranges in long storage." (Fulton); California, "Hard, firm decay at stylar end of oranges, especially Washington Navels, was more prevalent than usual, and fairly important although only a small percent of all oranges involved; Alternaria rot of lemons was about the same as usual, and was important in stock held in long storage." (Fawcett)

Brown rot caused by Pythiacystis citrophthora E. H. & R. E. Sm., California "Occurrence was less than usual, associated with less than normal moisture during season of greatest prevalence, from November to February; lemons are most susceptible, followed by oranges; controlled by spraying the ground and lower branches with 3-3-50 Bordeaux mixture." (Fawcett)

Grey mold rot caused by Botrytis cinerea Pers., California, "Occurred principally on lemon fruit, and was less prevalent than usual. (Fawcett)

Sclerotinia rot caused by Sclerotinia sclerotiorum (Lib.) Mass., California, "Less prevalent than usual, attributable to less than normal moisture; attacks lemons principally in storage." (Fawcett)

Fusarium rot caused by Fusarium spp., Florida, "Of minor importance usually as a form of blossom-end rot of oranges." (Fulton); Alabama, "Of minor importance as a cause of decay in long storage." (Fulton); California, "A minor decay of citrus fruits, firm to soft and pliable." (Fawcett)

Oospora rot caused by Oospora citri-aurantii C. O. Sm., Alabama, "Less than usual; follows insect puncturing of mature fruit in wet weather." (Fulton). California, "A sour, watery storage rot of lemons, of minor importance because of less long storage." (Fawcett)

Aspergillus rot caused by Aspergillus niger Tiegh. was reported from Florida and California; of minor importance, favored by high temperature

Trichoderma rot caused by Trichoderma lignorum (Tode) Harz, California, "A minor decay of citrus fruits, leathery and chocolate brown." (Fawcett)

GUMMOSIS DUE TO VARIOUS ORGANISMS

Pythiacystis gummosis caused by Pythiacystis citrophthora E. H. & R. E. Sm., California, "Less than usual, moisture being less than normal; causes death of bark on trunk and roots and is coextensive with citrus plantings; greatest injury in spring and summer; lemon, sweet orange and grapefruit stocks susceptible; trifoliate and sour orange stocks resistant." (Fawcett)

Botrytis gummosis caused by Botrytis cinerea Pers., California, "Was of minor importance being less than normal, the season being relatively dry; prevalent in the moister coastal regions; causes death of bark on trunk of lemons." (Fawcett)

Diplodia gummosis caused by Diplodia sp., California, "Occurs mostly on lemon in moister coastal sections causing death of local areas of bark and wood." (Fawcett)

Dothiorella gummosis caused by Dothiorella ribis (Fckl.) Sacc., California "A newly recognized disease causing death of areas of bark with formation of gum pockets on lemon trunks in moister coastal sections; lemons are most susceptible. (Fawcett)

Decorticosis (shell bark) caused by Phomopsis californica Fawc., California, "Less than usual; affects outer bark of trunk of lemon trees from 12 to 25 years of age; more usual in coastal region or moister foothills, less in interior drier sections." (Fawcett)

WOOD ROTS CAUSED BY TRAMETES HYDNOIDES, POLYPORUS GILVUS (SCHW.) FR., GANODERMA LUCIDUM (FR.) KARST.

Florida: Found more or less frequently on dead citrus trees, or growing from dead wood of footrot lesions at the bases of living seedling trees, undoubtedly hastening the decay and breaking off of the tree. Other fungi observed on dead citrus wood are Fomes fasciatus (Lev.) Fr., Schizophyllum commune Fr. and Daldinia concentrica (Bolt.) Ces. & DeNot. (Rhoads)

OTHER PARASITIC DISEASES

Rootrot, Armillaria mellea (Vahl) Quel., California, "Apparently increasing in importance. Distribution spotted, most prevalent where oaks have preceded citrus, or along river washes." (Fawcett)

Sooty mold, Capnodium citricolum McAlp., Florida (about same as usual; controlled by suppression of white fly and scale insects - Fulton), Texas, Porto Rico.

Algal leafspot, Cephaleuros virescens Kunze, was reported by Cook as occurring commonly in neglected orchards in Porto Rico.

Scaly bark and nailhead rust attributed to Cladosporium herbarum citricolum Fawc., Florida, "Limited to a few localities and most prevalent in old seedling orange groves that have been badly neglected; it frequently disappears from a planting without any special steps being taken to combat it." (Rhoads)

Felty fungus girdle, Septobasidium pedicellatum (Schw.) Pat., occurred on orange and tangerine in Florida. (Rhoads)

Lime withertip, Gloeosporium limetticolum Clausen, Florida (of major importance, affecting the Key and Thornless limes wherever they are grown. (Winston)

Citrus knot, Sphaeropsis tumefaciens Hedges, was reported of infrequent occurrence in Florida by Rhoads.

Orchids, (Ionopsis citricuterioides (Sw.) Lendl., and Leochilus labiatus (Sw.) Kuntz.), occasionally destructive in Porto Rico. (Cook)

Dodder, Cuscuta sp., caused stunting of young citrus seedlings in Florida, according to Rhoads.

NON-PARASITIC DISEASES OF CITRUS AND THOSE OF UNKNOWN CAUSATION

Dieback, Exanthema, Fruit Ammoniation, Florida, "Of frequent occurrence." (Rhoads). "Of major importance; oranges most susceptible; worst in flatwood groves; Bordeaux spray on leaves or bluestone applied to the soil in spring gives good control." (Winston); California, "About the same as usual; of minor importance; mostly in San Diego and Venturia Counties; gum pockets in twigs and fruit, staining and cracking of fruit." (Fawcett)

Frenching or Lime chlorosis was reported by Rhoads as being common and widely distributed in Florida. Winston reports less than usual and of minor importance; humus corrects the trouble. In California there is manifested a uniform yellowing of leaves where there is a calcareous substratum which probably brings about an iron deficiency. (Fawcett)

Mottle leaf was probably less than usual in California; investigations indicate a probable inability of the tree to satisfy its calcium requirements when the soil reaction is too alkaline. (Fawcett)

Gummosis (undet.) was reported by Rhoads as being widespread and frequently quite destructive, with tangerine trees appearing to be particularly susceptible in Florida. Winston reports it to be about the same as usual, of minor importance in Florida, and says that caustic disinfectant washes frequently cure the disease. Cook reports the disease as being severe sometimes in Porto Rico, and recommends treatment with carbolineum.

Psorosis (undet.) was reported by Rhoads and by Winston to be about the same as usual in Florida. Winston stated that it is of minor importance, and that caustic disinfectant paints or washes apparently cure the disease. California, "About the same as usual, affecting bark and wood of trunk and large limbs; coextensive with sweet oranges in the state, and the most important disease; grapefruit and occasionally tangerines are also affected; scraping method of treatment successful." (Fawcett)

Blight (apparently non-par.) was reported by Rhoads to be less common than formerly in Florida. It occurs most frequently on soils more or less closely underlaid by a coquina rock, less commonly on soils with a clay subsoil. Usually it is caused by a deficiency in the supply of available soil moisture during the dry season of the year, but often by excessive soil moisture for long periods in poorly drained situations with resultant death of roots. Winston reports it to be of minor importance in Florida except in a few localities where it is killing quite a few trees.

Peteca (cause uncertain) was of minor importance in California, being probably less than usual; it occurred in winter on lemon fruits producing characteristic sunken spots or pits in the rind. (Fawcett)

Endoxerosis (Internal decline) attributed to water relation in part, was fairly important in California, causing internal drying and browning of fruit of lemon only. (Fawcett)

Fruit splitting (non-par.) about the same as usual in Florida; usually occurring when heavy rains follow a period of drought in late summer or fall. (Rhoads)

Frost injury was not recorded from Florida, Alabama, or Louisiana. According to Alsmayer, of Texas, the fruit was frozen on the trees the last week in December 1925, in Hidalgo and Cameron Counties, and the trees were moderately damaged.

Lightning injury. Several cases were reported in Florida, according to Rhoads. Winston reports more than usual in Florida, causing minor damage.

Recent literature on various citrus diseases

1. Barger, W. F. Treating oranges with borax solution for control of blue and green mold. California Citrograph 10: 149. 1925.

2. ____________ and L. A. Hawkins. Borax as disinfectant for citrus fruit. Citrus Indust. 6 (9): 8-9, 24. 1925.

3. Barger, W. R., and L. A. Hawkins. Borax as a disinfectant for citrus fruit. Jour. Agric. Res. 3: 189-192. 1925.

4. Bartholomew, E. T. Report on internal decline (endoxerosis) of lemons. California Citrograph 10: 274, 294, 308. 1925.

5. Blanchard, V. F. Treatment of frost injured trees and fruit. California Citrograph 10: 148, 180-182. Mar. 1925.

6. Bragdon, K. E. Spray with Bordeaux-oil for control of melanose. Florida Grow. 32 (10): 15. Sept. 5, 1925.

7. Carne, W. M. Blue mold on oranges. Jour. Dept. Agr. Western Australia II, 2: 286-292. 1925.

8. __________ Citrus brown rot. Jour. Dept. Agr. Western Australia II, 2: 359. Sept. 1925.

9. __________ Citrus diseases. Brown rot and leaf blight. Jour. Dept. Agr. Western Australia II, 1: 519-522. Dec. 1924.

10. Doidge, E. M. Brown rot in citrus fruits (Pythiacystis citrophthora R. and E. Smith.) Jour. Dept. Agr. South Africa 10: 499-503. June 1925.

11. Fawcett, H. S. Observations on bark diseases of citrus trees in Sicily. Phytopath. 15: 41-42. Jan. 1925.

12. __________ Bark diseases of citrus trees in California. California Agr. Exp. Sta. Bull. 395: 1-61. Oct. 1925.

13. __________ The decay of citrus fruits on arrival and in storage at eastern markets. California Citrograph 10: 79, 98, 99, 103. 1925.

14. Fulton, H. R. and J. J. Bowman. Preliminary results with the borax treatment of citrus fruits for the prevention of blue mold rot. Citrus Indust. 6 (3): 10, 30, 31, 34. Mar. 1925.

15. __________ Relative susceptibility of citrus varieties to attack by Gloeosporium limetticolum (Clausen). Jour. Agric. Res. 30: 629-635. 1925.

16. Hodgson, R. W. Citrus trunk and root disease treatment. Amer. Fruit Grower 45 (2): 5, 44-45. 1925.

17. Jenkins, Anna E. The citrus scab fungus. Phytopath. 15: 99-104. 1925.

18. Kamat, M. N. Gummosis of citrus trees. Poona Agr. Coll. Mag. 17: 86-88. Sept. 1925.

19. Kater, J. M. Morphology and life history of Polytomella citri sp. nov. Biol. Bull. 49: 213-236. Sept. 1925.

20. Katzprowsky, S. Formaldehyde gas, a possible control of decay in lemons. California Citrograph 10: 254. May 1925.

21. Kay, A. O. Soil moisture studies in relation to diseased tree conditions in Brevard County. Citrus Indust. 6 (8): 5-9, 22-25. 1925.

22. Lambert, M. E. The present status of the citrus scab fungus - a recent discovery. Citrus Indust. 6(4): 11. Apr. 1925.

23. Lee, H. A. The comparative resistance to footrot of various citrus species as root stocks. Philipp. Jour. Sci. 27: 243-254. June 1925.

24. Lewcock, H. K. A citrus bacteriosis occurring in South Australia. (Abstract) Phytopath. 16: 80. Jan. 1926.

25. Smith, J. L. Safeguarding Satsumas from damage by cold waves. Florida Grower 32 (11): 7. 1925.

26. Stevens, Neil E. and Marguerite S. Wilcox. The citrus stem-end rot "Diplodia;" its life history and relation to Sphaeropsis malorum. Phytopath. 15: 332-340. 1925.

27. Webber, H. J. A comparative study of the citrus industry of South Africa. Bul. Dept. Agr. South Africa 1925 (6): 1-106. 1925.

28. Wickens, G. W. Exanthema of citrus trees. Rep. Proc. Imp. Bot. Conf. London 1924: 353-357. 1925.

29. Winston, J. R., J. J. Bowman, and W. J. Bach. Relative susceptibility of some rutaceous plants to attack by the citrus-scab fungus. Jour. Agr. Res. 30: 1087-1093. 1925.

30. Winston, J. R. Control melanose and thereby prevent "ammoniation." Citrus Indust. 6 (4): 9, 40, 44. Apr. 1925.

31. ____________ Commercial control of citrus melanose in Florida in 1923. Proc. Florida State Hort. Soc. 37 (1924): 127-129. 1924.

FIG

Rust caused by Physopella fici (Cast.) Arth. was reported as less than usual in Georgia (Boyd) and Louisiana (Edgerton). Unimportant in Texas. (Taubenhaus)

Leafspot caused by Cercospora sp. was reported as prevalent in Georgia (Boyd) and Texas (Taubenhaus)

Anthracnose caused by Glomerella cingulata (Ston.) Spauld. & Schrenk was reported as unimportant in South Carolina (Fenner) and Georgia (Boyd).

Soft rot causing a loss of 5 per cent in Georgia was attributed to Aspergillus sp. and Rhizopus sp., according to Boyd, this amount being less than usual due to dry weather. According to Taubenhaus of Texas a loss of one-half per cent was estimated for soured fruits, cause unknown.

Limb blight caused by Corticium sp. was reported from Georgia by Boyd.

Twig blight was reported from Washington by Frank as caused by Botrytis sp.

Canker caused by Tubercularia fici Edgerton was found in about 50 per cent of the plantings in Georgia, causing a loss of 5 per cent, through death of twigs and limbs, and in some cases entire trees. (Boyd)

Canker caused by Macrophoma fici Alm. & Cam. was reported from Texas. (Taubenhaus)

Texas root rot caused by Ozonium omnivorum Shear was prevalent in the black lands of Texas, causing slight loss. (Taubenhaus) Reported as threatening damage in Arizona.

Rootknot caused by Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb) was reported from a nursery in Georgia. (Boyd) Prevalent in Texas causing trace of damage. (Taubenhaus)

Premature dropping (non-par.) was very prevalent in Texas. (Taubenhaus)

Recent literature on fig diseases

1. Brown, Nellie A. A note on a rot of the Smyrna fig in California. Science n.s. 62: 288. 1925.

2. Caldis, Panos D. A rot of the Smyrna fig in California. Science n.s. 62: 161-162. 1925.

3. Fairbanks, R. B. The fig industry in Texas. Amer. Fruit Grower 45 (4): 8, 20. 1925.

4. Maffei, L. Sul parassitismo di Phomopsis cinerescens (Sacc.) Trav. sopra i rami del Fici. (On the parasitism of Phomopsis cinerescens (Sacc.) Trav. on the branches of the Fig.) Riv. Patol. Veg. 15: 37-47. 1925.

5. Phillips, E. H., E. H. Smith, and R. E. Smith. Fig smut. California Agr. Exp. Sta. Bul. 387: 1-38. 1925.

DATE PALM

Rust caused by Graphiola phoenicis (Moug.) Poit. Unimportant in Texas (Taubenhaus); Porto Rico (Cook).

Leafspot caused by Exosporium palmivorum Sacc., Texas (unimportant).

Pestalozzia blight caused by Pestalozzia sp., Texas (unimportant).

Recent literature

1. Pinoy, P. E. Sur la maladie du "Bayoud" des palmiers de Figuig. Compt. Rend. Soc. Biol. Paris 92: 137-138. Jan. 1925.

PINEAPPLE TO AVOCADO

PINEAPPLE

Fruit rot caused by Thielaviopsis paradoxa (de Seyn.) Hoehn. was reported from Porto Rico as sometimes severe on fruit; unimportant during 1925. (Cook) This disease was reported by Roldan as new to the Philippine Islands.

Chlorosis, due to too much lime, was reported from Porto Rico. Good results were obtained from spraying with iron sulfate. (Cook)

Rootrot (cause not given) was reported as troublesome in Florida.

Recent literature

1. Lyman, L. T. The rootrot problem from the field standpoint. Ann. Short Course Pineapple Prod. Hawaii Univ. Ext. Serv. Dept. 4: 99-105. 1925.

2. Roldan, E. F. The soft rot of pineapple in the Philippines and other countries. Philipp. Agr. 13: 397-405. Feb. 1925.

3. Sideris, C. P. Physiological and pathological studies on pineapples. Ann. Short Course Pineapple Prod. Hawaii Univ. Ext. Serv. Dept. 4: 87-99. 1925.

OLIVE

Knot or tubercle disease caused by Bacterium savastanoi EFS. was reported from California as being more serious than usual, killing many limbs or twigs; occurs only in Sacramento and lower San Joaquin Valleys; favored by copious spring and winter rains; Manzanillo variety mainly attacked. (Horne)

Dry rot (soft nose), probably physiological, was reported to be more serious than usual in California. Losses as high as 50 per cent occurred in some orchards; fruit soft at end, shrivels, and spoils; mostly confined to Sevillano variety. (Horne)

Recent literature

1. Laubert, R. Die Zweigkrankheit der Oliven. (The branch disease of olives.) Gartenwelt 29: 502. 1925.

AVOCADO

Scab caused by Sphaceloma sp. was reported as widespread in Florida causing serious leaf spotting.

Anthracnose caused by Colletotrichum gloeosporioides Penz. was reported as destructive on young fruit and on succulent new growth in Florida. Common but unimportant in Porto Rico. (Cook & Tucker)

AVOCADO TO PAPAYA

Leafspot caused by *Pestalozzia guepini* Desm. was reported as local in Florida. In Porto Rico it kills young seedlings and branches on larger trees. (Cook) It is unimportant in Texas.

Leafspot caused by *Phyllosticta* sp. was reported to be of little importance in Florida.

Tar spot caused by *Phyllachora gratissima* was reported as being common in high places in Porto Rico. (Cook & Tucker)

Southern blight caused by *Sclerotium rolfsii* Sacc. was reported as occurring in one instance on nursery plants in Florida.

Footrot (cause not indicated) caused some loss in nursery plantings and newly set trees in Florida; not serious.

Algal leafspot caused by *Cephaleuros virescens* Kunze was reported as not serious in Florida. Very common in Porto Rico.

Recent literature

1. Anon. Avocado black spot can be controlled by Bordeaux mixture. Florida Grow. 31 (1): 34. Jan. 3, 1925.

2. Horne, Wm. T. Preliminary notes on avocado fruit decay. (Abstract) Phytopath. 16: 80. Jan. 1926.

MANGO

Anthracnose caused by *Colletotrichum gloeosporioides* Penz. was reported as being widespread and destructive in Florida, attacking the fruit and twigs, and causing damping-off of seedlings. Common in Porto Rico.

Leafspot caused by *Pestalozzia guepini* Desm. was reported from Porto Rico.

Leafspot caused by *Septoria* sp. was reported as unimportant in Florida.

Sooty mold caused by *Meliola mangiferae* Earle was reported to be common in Porto Rico.

Withertip caused by *Diplodia* sp. was reported as not severe in Porto Rico.

Trunk galls (cause not indicated) were reported from Porto Rico.

PAPAYA

Leafspot caused by *Pucciniopsis caricae* Earle was reported to be widespread but unimportant in Florida; also reported from Porto Rico.

Recent literature

1. Mowry, Harold. Papaya culture. Florida Grower 32 (3): 36. 1925.

2. Uphof, J. C. TH. Das Verhalten von Pucciniopsis caricae Earle auf der Papaya (Carica papaya) in Florida. (Pucciniopsis caricae Earle, on Carica papaya in Florida.) Zeitschr. Pflanzenkrankh. 35: 118-122. 1925.

GUAVA TO PERSIMMON

GUAVA

Anthracnose caused by Colletotrichum gloeosporioides Penz. was reported from Florida; in one instance destroyed young fruit and leaves. Abundant in Porto Rico.

Leafspot and fruitrot caused by Gloeosporium psidii Del. was reported from several localities in Florida.

Leafspot caused by Pestalozzia sp. was found in a few localities in Florida; unimportant.

Root and trunk rot caused by Clitocybe monadelpha (Morgan) Sacc. (C. tabescens (Scop.) Bres.) was reported from a number of localities in Florida.

BANANA

Anthracnose caused by Gloeosporium musarum Cke. & Mass. was reported as common on all varieties in Porto Rico. (Cook & Tucker)

Wilt caused by Fusarium cubense EFS. was reported to be destructive on certain varieties throughout Porto Rico. (Cook & Tucker)

Recent literature

1. Ashby, S. F. Researches on Panama disease. Proc. West. Indian Agr. Conf. 9 (1924): 51-53. 1925.

2. Benson, A. H. Leafspot on bananas. Queensl. Agr. Jour. 24: 392-393. Oct. 1925.

3. Campbell, J. G. C. Banana diseases in Vitilevu. Agric. Circ. Dept. Agr. Fiji 5: 67-75. Jan.-June 1925.

4. Hansford, C. G. Some remarks on questions raised by the Panama disease of bananas. Proc. West Indian Agr. Conf. 9 (1924): 41-50. 1925.

5. ______________ and J. B. Sutherland. Panama disease of bananas. Jour. Jamaica Agr. Soc. 29: 237-240. 1925.

6. Tryon, H. Banana - internal fruit discoloration. Queensland Agr. Jour. 24: 122-123. 1925.

PERSIMMON

Leafspot caused by Cercospora sp. was reported to be general in the coastal plain region of Georgia, causing defoliation. Found generally in Florida but causing little damage.

Leafspot caused by Pestalozzia guepini Desm. was reported to be very common in Florida, causing defoliation in late fall.

Leafspot caused by Ramularia sp. was reported from western Florida.

Black mold caused by Macrosporium sp. was reported from western Florida, causing some defoliation.

Leaf speck caused by Leptothyrium pomi (Mont. & Fr.) Sacc. was more or less common on the fruits in Florida.

Anthracnose caused by Gloeosporium diospyri Ell. & Ev. was generally found in Florida, causing some withertip.

Hypochnose caused by Corticium stevensii Burt was reported from one locality in Florida.

BREADFRUIT

Rust caused by Uredo artocarpi Berk. & Br. was reported from Porto Rico. (Tucker)

Algal leafspot caused by Cephaleuros virescens Kunze was reported from Porto Rico. (Tucker)

POMEGRANATE

Leafspot caused by Cercospora lythracearum Heald & Wolf was reported from Florida as unimportant.

Anthracnose caused by Colletotrichum sp. was reported on fruit and twigs in Florida.

DISEASES OF NUTS

PECAN

SCAB CAUSED BY FUSICLADIUM EFFUSUM WINT.

Pecan scab is probably the most important disease of this crop.

South Carolina: Less than usual. Occurred throughout the Sandhill regio northward to the edge of Piedmont area. (Fenner)

Georgia: Pecan scab was very important in spite of general shortage of rainfall. Estimated loss 5 per cent. Most prevalent in the southernmost counties, especially in heavy plantings of Schleys. Rainfall during May, June, and July being lighter and less frequent than usual accounted for less injury than usual. Delmas were a total loss in most sections. Alleys and Schleys were less susceptible and scabbing about same. Much less on Van Deman than Schley. Mobile and Frotcher showing considerable nut infection. (Boyd)

Florida: Common wherever the host was growing in the state. The disease was generally worse than last year. Of considerable economic importance. (Weber)

Mississippi: Light infection on account of drouth. (Beal)

According to Demaree (1) all fungicides tried were found inferior to Bordeaux mixture in controlling scab. Bordeaux, however, causes severe foliage injury under certain conditions. Data from four orchards indicate that the cost of spraying pecans ranges from 30 to 95 cents per tree. Dusts were found to be of little value. Topworking of susceptible varieties, orchard sanitation, including plowing, and spraying with Bordeaux are recommended.

Working under Mississippi conditions Neal (2) reports the results of Bordeaux-oil emulsion for pecan scab control.

> "After the success we have obtained with it in pecan spraying under Mississippi conditions, especially for combating scab during wet seasons, we believe it far superior to the plain Bordeaux mixture, Bordeaux fish-oil soap, or other fungicides which we have used."

Recent literature

1. Anon. Spray pecans this summer and control scab disease. Citrus Industr. 6 (6): 14. June 1925.

2. Demaree, J. B. Progress report on pecan scab spraying experiments. Proc. 23d Ann. Conv. Nat. Pecan Growers Assoc. 1924: 58-61. 1925.

3. Demaree, J. B. Apparent limitations to pecan scab control. Amer. Nut Jour. 12: 41-42. Mar. 1925.

4. Neal, D. C. Bordeaux-oil emulsion for pecan scab control. Proc. 23d Ann. Conv. Nat. Pecan Growers Assoc. 1924: 61-63. 1925.

POWDERY MILDEW CAUSED BY MICROSPHAERA ALNI (WALLR.) WINT.

This disease was reported from Georgia, Florida, and Texas. According to Boyd of Georgia, the varieties Mobile and Success in one orchard were heavily infected. In Florida, according to Weber, it was common on nursery stock where it caused considerable damage but otherwise was not serious.

ROSETTE (UNKNOWN)

Rosette was reported from South Carolina, Georgia, Florida, Texas, and Kansas. A 10 per cent loss was reported from Georgia.

Georgia: Seen on all of the varieties common here. Trees affected with this disease usually set very lightly or not at all. Many badly affected trees lost their leaves entirely during September and

October. Most serious disease of the state. Recommend improvement of soil by cultivation and fertilization, especially the addition of organic matter. (Boyd)

Recent literature

1. Skinner, J. J. and J. B. Demaree. Relation of soil conditions and orchard management to the rosette of pecan trees. U. S. Dept. Agr. Bul. 1378: 1-16. Feb. 1926.

OTHER DISEASES AND INJURIES

Bacterium tumefaciens EFS. & Town., crowngall, Florida (on a few seedlings, not common).

Botryosphaeria berengeriana De Not., dieback, South Carolina (serious locally), and Florida (common and occasionally serious).

Cercospora fusca (Heald & Wolf) emend. Rand, brown leafspot, Georgia, Florida, and Texas. In Georgia, brown spot was reported by Boyd to be "Of minor importance this year, except on trees affected with rosette."

Corticium stevensii, Florida (not common)

Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose, Georgia (very little importance), Florida.

Microstroma juglandis (Bereng.) Sacc., leafspot, Florida.

Mycosphaerella convexula (Schw.) F. V. Rand, leaf blotch, Florida.

Pestalozzia uvicola, leafspot, Florida (common but not important).

Phyllosticta caryae Pk., leafspot, Georgia (slight importance).

Blackpit (non-par.) Reported from Georgia where it was thought to cause 2 per cent loss. According to Boyd, Frotcher and Schley were injured most heavily, drops of 5 to 15 per cent being noted. One planting of Delmas were beginning to rosette to the extent of 35 per cent loss while Stewart and Schley in the same orchard were not materially affected.

Die-back (undet.), Kansas (slight).

Mouse ear (non-par.), Florida (not common. On bearing trees and nursery stock).

Texas root rot, Texas, Arizona. (Ozonium omnivorum Shear)

Recent literature

1. Mahan, F. A. Spray injury to pecan trees. Nat. Pecan Exchange News 2: 6-7. May 1925.

2. Wenzel, O. J. Woodrot in pecan trees. Nat. Pecan Echange News 2: 9-12. July 1925.

ENGLISH WALNUT

BACTERIAL BLIGHT CAUSED BY BACTERIUM JUGLANDIS (N. B. PIERCE) EFS.

This disease was reported to be very important in Oregon where it caused a loss estimated at 33 per cent and in California where the loss was estimated

at 4 per cent. According to Barss of Oregon, much more bacterial blight occurred this year than in 1924. Some of the larger growers reported it worse on seedling trees than on grafted trees while usually the reverse is true. Milbrath. of California, reported the disease worse this year than last year in all parts of the state.

JAPANESE WALNUT

Rosette (undet.) South Carolina. "Have had one report about September 1 of the rosette disease on Japanese walnut. It resembles pecan rosette a good deal. A detailed description cannot be given as the disease was not seen in the field. This is the first time I have seen the disease on this host." (Ludwig)

FILBERT

Bacterial blight caused by Bacillus coryli was said by Barss to be much less prevalent than in 1924 in Oregon, but it is always an important disease in that state especially on young trees 1 to 5 years old or on the small wood of older trees.

ALMOND

Scab caused by Cladosporium carpophilum Thuem., Oregon (no importance).

Brownrot caused by Sclerotinia cinerea (Bon.) Schroet., California, (worse this year than last, destructive on Drake variety; blossom and twig infection in the San Joaquin Valley.)

Rust caused by Tranzschelia punctata (Pers.) Arth., California, (worse than last year causing premature leaf dropping.)

Recent literature

1. Smith, R. E. and E. H. Smith. Further studies on Pythiaceous infection of deciduous fruit trees in California. Phytopath. 15: 389-404. 1925.

2. Taylor, R. H. and G. L. Phillip. The almond in California. California Agr. Exp. Sta. Circ. 284: 1-57. Apr. 1925.

COCONUT

BUDROT CAUSED BY PHYTOPHTHORA FABERI MAUB.

This disease was reported from Porto Rico and Florida. In Porto Rico it was severe along the west coast. According to A. S. Rhoads, of Florida, "Phytophthora faberi has not been found in the south central and southwestern portions of the state, but is generally distributed along the southeast coast where 95 per cent of the coconuts are found. In a nursery near Miami 12 per cent of the plants have been destroyed by budrot. From 350 collections of bud-rotted plants, 68 have yielded Phytophthora faberi. In making isolations from budrotted plants such organisms as bacteria, yeasts, nematodes, etc. are found associated with the condition, but their true role has not been determined.

MISCELLANEOUS DISEASES AND INJURIES

Colletotrichum sp., anthracnose, Florida and Porto Rico. "This organism occasionally causes a premature falling of the fruit. Not important in Porto Rico." (Cook). In Florida it is coexistent with the host, causes severe spotting of the leaves and petioles and is of some importance to young plants.

Exosporium sp., leafspot, Florida (few cases, of minor importance).

Pestalozzia palmarum Cke., leafspot, reported from Florida (general, some damage on nursery plants) and Porto Rico.

Phyllosticta sp., leafspot, Florida (quite common on leaves but of little or no importance).

Thielaviopsis paradoxa (De Seyn.) Hoehn., stem-bleeding disease, Porto Rico and the Philippine Islands. According to Roldan (11) this organism causing softrot of pineapple, pineapple disease of sugar cane, and coconut stem-bleeding disease recently broke out in the Philippines. It is present also in Hawaii, Java, West Indies, India, Ceylon, and southern United States.

In Florida a disease called "bitten leaf" and caused by this same fungus was found quite generally on both young and old plants. In this case the chief damage was the curling of the leaflets and occasional destruction of the bud. Has been found to attack also the roots of young plants.

Recent literature

1. Ashby, S. F. Budrots of the coconut palm in the West Indies. Rep. Proc. Imp. Bot. Conf. London 1924: 153-158. 1925.

2. ___________ Red ring disease of the coconut. Proc. West. Indian Agr. Conf. 9: 164-172. 1925.

3. ___________ Budrot of coconut palms in Porto Rico. Tropical Agriculture 2: 201. Sept. 1925.

4. Butler, E. J. Budrot of coconut and other palms. Rep. Proc. Imp. Bot. Conf. London 1924: 145-153. 1925.

COCONUT - Miscellaneous Literature

5. Dowson, W. J. Some observations on the budrot disease of coconut palms on the east coast of Africa. Rep. Proc. Imp. Bot. Conf. London 1924: 159-161. 1925.

6. Gadd, C. H. Inoculation experiments with Phytophthora faberi Maubl. Yearbook Dept. Agr. Ceylon 1925: 15-17. 1925.

7. Nowell, W. Coconut budrot in Trinidad. Rep. Proc. Imp. Bot. Conf. London 1924: 161-162. 1925.

8. __________ Coconut budrot in Trinidad. Trop. Agr. 64: 277. May 1925

9. Newell, Wilmon. Report of plant commissioner for the biennium ending June 30, 1924. Florida State Plant Bd. Quart. Bul. 9: 59-117. 1925.

10. Petch, T. A thread blight on coconuts. Yearbook Dept. Agr. Ceylon 1925: 27-28. 1925.

11. Roldan, E. F. The soft rot of pineapple in the Philippines and other countries. Philipp. Agr. 13: 397-405. Feb. 1925.

12. Sharples, A. Observations on budrot of Palms. Rept. Imper. Bot. Conf. London 1924: 147-153. 1925.

13. Shepherd, E. F. S. Une maladie suspecte des racines du cocotier. Rev. Agr. Ile Maurice 1925: 482-484. May-June 1925.

14. Tucker, C. M. Coconut budrot experiments in Porto Rico. Science 61: 186-187. 1925.

15. ____________ Controlling coconut budrot. West India Comm. Circ. 40: 44. Jan. 1925.

16. ____________ Mesures de contrôle de la pourriture du coeur du cocotier. Rev. Agr. Ile Maurice 1925: 421-422. Mar.-April 1925.

THE PLANT DISEASE REPORTER

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Supplement 48

Diseases of Cereal and Forage Crops

In the United States in 1925

July 1, 1926

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

DISEASES OF CEREAL AND FORAGE CROPS IN THE UNITED STATES IN 1925

Prepared by

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Bureau of Plant Industry.

Plant Disease Reporter
Supplement 48

July 1, 1926

CONTENTS

INTRODUCTION

The following summary is the eighth successive annual compilation of diseases of cereal and forage crops to be issued by the Plant Disease Survey. It is based on reports of state collaborators received from practically all states where cereals are important; on reports from members of the Office of Cereal Crops and Diseases and the Office of Vegetable and Forage Diseases; and on information contained in published papers, articles, and news notes that have appeared during the year.

The total number of individual disease records received and used in preparing this summary was 2,632. These were divided among the various sources as follows:

Collaborators	
Annual report cards	1,727
Semi-monthly reports	287
Notes in letters	61
Reports from Offices of the Bureau of Plant Industry	73
Reports from other pathologists	50
Literature references	434
	2,632

These reports were substantiated by 39 specimens.

The quality of information on cereal and forage crop diseases received by the Survey seems to be improving, and the quantity increasing, each year. Pathologists working on these diseases are furnishing notes and specimens more frequently than formerly, and collaborators are doing good work considering the difficulties with which they have to contend. However, there still remains much opportunity for improvement. It is hoped that all who use this summary will keep in mind the fact that the Plant Disease Survey should be supplied with reports from the field concerning plant diseases, and that this information should be sent in as it is accumulated for use in the

Plant Disease Reporter and for recording. All observations, even though they may appear relatively insignificant, are wanted and will be appreciated. In case of the less common or rare diseases, specimens are needed to substantiate the reports.

THE WEATHER OF 1925 AND ITS RELATION TO DISEASES OF CEREAL AND FORAGE CROPS

The weather during the growing season of 1925 was in many respects most unusual, and this in turn was reflected in the occurrence and prevalence of plant diseases. From April throughout the summer until September, the season was unusually dry in practically all states east of the Rocky Mountains. In some states west of the Rockies, however, particularly California, more rains occurred than usual in the summer; also in parts of the spring wheat region the month of June was wet, a fact which had its influence on cereal diseases in those states.

The temperature was above normal in states east of the Rockies, with the exception of the month of May which was generally cool. It may be said, therefore, that in general, with certain exceptions, warm and dry weather prevailed. Tables showing departures from normal temperature and rainfall by states have already been given in Plant Disease Reporter, Supplements 45 and 46, and the reader is referred to these tables for more detailed data.

As an apparent result of these weather conditions, the leaf rusts of cereals occurred in less amounts than usual. The same is true of ergot of cereals and grasses, anthracnose of small grains and grasses, the Septoria diseases of wheat, Diplodia dry rot of corn, wilt and rust of flax, and certain of the leafspot diseases of alfalfa, clover, and other legumes. Except in the spring wheat area and in California, where the rainfall was above normal during June, stem rust of cereals was probably less prevalent than usual. In the areas mentioned, however, it was more than normally prevalent and assumed epidemic proportions. The scab disease of cereals was less common than usual except in the spring wheat area where it was important. In California such diseases as stem rust, foot rot (Helminthosporium) of wheat, glume blotch of wheat, and halo blight of oats were reported to be more abundant than usual. The smut diseases, which are not influenced so much by late spring and early summer weather, but more by conditions during the time of germination, or during flowering time, in the case of loose smuts, did not show much change from normal except in the case of bunt which was more abundant than usual, and of oat smut which was more prevalent in some of the Southern States. In general it may be said that 1925 was an off-year for cereal diseases with the exception of the smuts.

SEED TREATMENT OF CEREALS

Steady advances continue to be made in investigation of materials and methods for seed treatment for cereal diseases, and in their practical application. Copper carbonate dust has come rapidly into general use as a preventive for bunt of wheat and to some extent also for the covered kernel smut of sorghum.

It is being used on oats and other grains but with less satisfactory results. Many investigators are engaged in experimenting with organic mercury, copper, nickel, and other compounds, and combinations of them, for the control of seed-borne diseases of corn and other crops with promising results. Application of organic mercury to the soil for the control of such diseases as brown patch of turf has given more or less satisfactory control.

An important event of the year, as far as the smut diseases of cereals is concerned, is the organization of the "Northwest Grain Smut Prevention Committee" with headquarters at Minneapolis. Represented on this Committee are the state agricultural colleges, the United States Department of Agriculture, business organizations, railroads, and newspapers. This Committee is putting on a grain smut prevention campaign in Minnesota, North and South Dakota, and Montana and as a result of it the losses from smuts, particularly bunt of wheat, should be materially reduced.

References dealing with seed treatment work will be found in this summary under the various disease headings, especially the smut diseases of cereals, and in addition the following articles, dealing for the most part with seed treatment in general, are listed.

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14. Rodenhiser, H. A., and E. C. Stakman. The control of loose smuts of wheat and barley, and barley stripe by uspulun, semesan, and germisan. (Abstract) Phytopath. 15: 51. Jan. 1925.

15. Sampson, Kathleen, and D. W. Davies. Dry treatment of smut diseases of cereals. Welsh Jour. Agric. 1: 169-176. 1925.

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17. Throssell, G. L. A simple dry pickler. Jour. Dept. Agr. Western Australia 2: 20-21. 1925.

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DISEASES OF CEREAL CROPS

WHEAT

BUNT CAUSED BY TILLETIA LAEVIS KUEHN AND T. TRITICI (BJERK.) WINT.

Two outstanding facts with regard to the occurrence of bunt in 1925 were, first, the unusual prevalence of the disease in certain parts of the country, especially in the middle Atlantic states and in parts of Kansas and Colorado; and second, the less than usual amount in the Pacific Northwest.

In the past bunt has not usually been considered of much importance in the Eastern United States but last year it was serious in New York and was rated as the most important wheat disease in Pennsylvania, Delaware, Maryland, and Virginia. In Pennsylvania it was more severe than in any other year for which records were kept, in Delaware buyers reported the greatest amount of bunt ever experienced, and in Virginia collaborators reported the highest infection in the history of their ten years' experience in the state. Estimates of losses are to be found in table 74. Concerning its importance in the middle Atlantic States, collaborators have reported as follows:

New York: If this disease is as prevalent in 1926 as it was this year, a campaign of seed treatment will have to be organized. (Chupp)

Pennsylvania: Five times as much this year as last; more severe than any other year for which we have records; mostly in eastern quarter of state, however, it was general over the whole state. (Kirby)

Delaware: Greater prevalence than ever experienced according to buyers; yield losses of 30 to 70 per cent were found in Kent County. (Adams)

Virginia: Much more than last year or the average year, easily the most important wheat disease. Especially in the northern and southern parts of the state.

Our data on smut losses is mostly from millers' reports rather than from field surveys. A brief synopsis of a few of these reports follows:

Edinburg - 70 per cent of crops affected, 25 per cent unfit for milling.
Albemarle County - 10 per cent of wheat unfit for milling.
Campbell County - practically all crops affected.
Rockingham County - refused to buy a number of crops.
Alexandria - lots of smut in almost every lot.
Chase City - more than ever before.
Richmond - hardly a sample that does not show smut.
Wythe County - 50 per cent affected, some unfit for milling. (Fromme)

The states of Kansas, Montana, Colorado, Utah, and California reported more than last year and more than normal, and in the spring wheat states, Minnesota and the Dakotas, the wheat was found to be unusually smutty as threshing and marketing progressed. In Kansas, where the loss was estimated at from $7,000,000 to $8,000,000, it was worst in the northwestern counties, less severe in central Kansas, and practically negligible in eastern Kansas; in Colorado it was general but most important in the eastern part of the state; in California it was worst in the Montezuma Hills region.

The reduction in amount of bunt in the Northwest, including Idaho, Washington, and Oregon, is attributed to the very heavy killing of fall-seeded wheat by low temperatures and the resulting preponderance of spring wheat which seemed to be only slightly infected. Regarding this situation collaborators of Washington and Oregon report as follows:

> Washington: Because of very heavy winter killing of fall seeded grain there is an unusual acreage of spring wheat. The amount of smut is, therefore, lower than it has been in some years since there is very little smut in spring wheat. (Dept. Plant Path.)

> Oregon: Extremely cold weather in December following two weeks of exceptionally warm weather for winter froze out most of the winter wheat, and caused reseeding of 90 per cent of the acreage in eastern Oregon. Hybrid 128 and Jenkins Club, winter wheat varieties ordinarily grown, are very susceptible to bunt, and the loss averages usually about 5 per cent in both. Varieties replanted this year were Federation, Hard Federation, and Marquis, all resistant to bunt. At least 30 or 40 per cent of the fields had no bunt in them, and in those that did there was not more than 1 per cent. Besides this, soil contamination is not a factor in infection of spring grain. The little winter wheat left had all the weaker plants, including bunt-affected plants, frozen out, so that there was less bunt than usual even in the winter wheat, and the unusual preponderance of spring wheat made the percentage in the total crop much less. (Barss)

Table 74. Estimated percentage field loss from bunt according to collaborators, 1925.

State	Average percentage loss	Maximum percentage in any field	State	Average percentage loss	Maximum percentage in any field
New York	1.2	-	Iowa	Trace	-
New Jersey	Trace	-	North Dakota	2	55
Pennsylvania	3	-	South Dakota	2	-
Delaware	4	70	Kansas	6	80
Maryland	2	-	Kentucky	Trace	-
Virginia	4	-	Arkansas	3	20
West Virginia	Trace	-	Montana	3	50
North Carolina	1	-	Colorado	15	75
Ohio	1	25	Arizona	5	15
Indiana	Trace	-	Utah	1	-
Illinois	Trace	10	Idaho	3	-
Michigan	1	-	Oregon	0.5	-
Minnesota	0.2	15	California	1	25

Weather relations:

It is generally recognized that soil and weather conditions during the time of germination are very important in influencing bunt infection, therefore, an inquiry into the environmental conditions that prevailed in the fall of 1924 in the Middle Atlantic States and their relation to the epiphytotic of bunt may be of value.

Soil temperature at the time of germination is important. Woolman and Humphrey (U. S. Dept. Agr. Bul. 1239: 1-29, 1924) at Pullman, Washington found that mean soil temperatures of from 40.8° to 62°F. gave over 90 per cent Tilletia tritici. Hungerford (Phytopath. 12: 337-352. 1922), in Idaho, found that the optimum temperature for infection with the same fungus was from 48° to 54°F. It would seem, therefore, that comparatively low temperatures are favorable for Tilletia tritici. Probably the same statement holds for Tilletia laevis, although not so much work has been done regarding the temperature relations of that fungus.

Weekly telegraphic summaries in the Weather and Crop Bulletin of the United States Department of Agriculture show that in Pennsylvania the period of wheat seeding in the fall of 1924 began about the middle of September and ended about October 1924. The period of maximum germination would seem to be during the first two weeks of October. In Virginia sowing began somewhat later and apparently extended from about October 1 to November 7 with maximum germination probably occurring during the two weeks ending October 14 and 21. An examination of the temperatures during these periods shows that the air temperatures were much lower than normal. The soil, therefore, must have been abnormally cold. In table 75 are shown the weekly temperatures and departures from normal for the period of wheat seeding at three stations in Pennsylvania and three stations in Virginia.

Table 75. Average weekly temperatures and departures from normal Sept. 16 - Oct. 21, 1924, at three Pennsylvania and three Virginia stations.

Station	Sept. 16 Av.	Sept. 16 Dep. from norm.	Sept. 23 Av.	Sept. 23 Dep. from norm.	Sept. 30 Av.	Sept. 30 Dep. from norm.	Oct. 7 Av.	Oct. 7 Dep. from norm.	Oct. 14 Av.	Oct. 14 Dep. from norm.	Oct. 21 Av.	Oct. 21 Dep. from norm.
Scranton	°58	-6	°62	0	°58	-1	°56	0	°52	-2	°52	+1
Harrisburg	62	-5	62	-3	58	-4	60	+1	56	-1	58	+4
Philadelphia	64	-5	64	-3	64	-1	62	0	60	0	58	+1
Richmond	66	-6	66	-3	64	-3	62	-2	58	-4	62	+3
Lynchburg	64	-6	64	-4	60	-5	60	-3	58	-2	64	+6
Wytheville	60	-4	62	0	56	-4	54	-4	58	+3	60	+7

It will be seen that the week ending October 21 is the only one in which temperatures were above normal. The statement is made, in the reports of the Weather Bureau, that in Pennsylvania September 1924 was the coldest September in the history of the weather service with the exception of the years 1868 and 1917; and in Virginia also it is stated that unusually cold weather occurred during that month. The month of October was below normal in Virginia and only slightly above normal in Pennsylvania, with respect to temperatures.

The precipitation or amount of soil moisture must also be considered in this connection and so table 76 giving the rainfall and departures from normal for the same six Pennsylvania and Virginia stations has been prepared.

Table 76. Average weekly precipitation and departures from normal for weeks ending Sept. 16 to Oct. 21 inclusive, for six stations in Pennsylvania and Virginia.

Station	Sept. 16 Av.	Sept. 16 Dep. from norm.	Sept. 23 Av.	Sept. 23 Dep. from norm.	Sept. 30 Av.	Sept. 30 Dep. from norm.	Oct. 7 Av.	Oct. 7 Dep. from norm.	Oct. 14 Av.	Oct. 14 Dep. from norm.	Oct. 21 Av.	Oct. 21 Dep. from norm.
Scranton	0.7	-0.2	0.3	-0.3	3.7	+3.2	1.7	+1.1	0.1	-0.7	T	-0.7
Harrisburg	0.2	-0.7	0.4	-0.2	3.5	+2.9	0.6	0	T	-0.8	0	-0.7
Philadelphia	1.1	0	1.0	0	1.2	+0.6	1.3	+0.6	0.1	-0.6	0	-0.7
Richmond	1.1	+0.1	2.5	+1.7	4.1	+3.4	0.9	+0.3	0	-0.5	T	-0.8
Lynchburg	T	-0.1	1.5	+0.6	2.5	+1.7	T	-0.9	0	-0.6	0	-0.7
Wytheville	T	-0.8	2.0	+1.2	3.4	+2.6	0.1	-0.6	0	-0.6	0	-0.7

In general, it was comparatively dry during the period of wheat germination. The September rainfall in Pennsylvania was considerably above the normal, but this excess was due to heavy rains, including more than half of the precipitation for the month, which occurred on the last few days. There was an abundance of rain in Virginia during that month. October, however, was very dry in both of these states. From the work of Hungerford and of Woolman and Humphrey, cited above, it seems that a moist, but not very wet, soil is favorable for germination and infection by the bunt organism. According to the weather records cited it would appear that during seeding time the soil was probably not over-wet but, if anything, rather dry. Of the two factors, temperature and moisture, that have a bearing on the percentage of bunt it would seem that temperature was probably the more important last year and that it was largely the cool weather preceding, during, and subsequent to seeding that brought about the great increase in the amount of the disease.

Varietal susceptibility:

Concerning varietal susceptibility collaborators in Michigan report Berkeley Rock highly resistant, while those in Minnesota and North Dakota mention Kota and Prelude as very susceptible, with Marquis resistant. Only a trace of bunt was noted on Marquis in Colorado, while in most of the winter wheats the loss averaged about 15 per cent. It will be noted that in the report, quoted above, for Oregon, the winter wheats, Hybrid 128 and Jenkins Club, are said to be very susceptible, while the spring wheats, Federation, Hard Federation, and Marquis, are mentioned as resistant.

In an extensive series of experiments conducted in the Pacific Coast States, extending over two years, Tisdale, Martin, and others (21) have determined the relative resistance to bunt of the commercial wheats of the United States. Of four commercial classes of common wheat, the hard red winter wheats were found to be most resistant while the white wheats were as a class most susceptible. The hard red spring and soft red winter varieties were somewhat intermediate in susceptibility, although one of the soft red winter varieties

proved highly resistant. The club wheats as a rule were the most susceptible to bunt. The varieties and strains found to be immune or highly resistant are enumerated. Among them are two varieties, Hussar and Martin, which proved to be immune. The probable value of these wheats for further hybridization work and for commercial planting is indicated.

Control:

In connection with the report on cereal diseases, collaborators were asked to what extent the copper carbonate method of seed treatment was being used, and to estimate the amount of copper carbonate employed. The replies to these questions follow. It will be noted that the copper carbonate treatment is the principal one used in all states where the disease is at all serious and that rapid progress has been made in introducing it.

Connecticut: Not used at all. (Clinton)

New York: None used or at least only in a very few cases. (Chupp)

Pennsylvania: Previous to 1924 little or no wheat was treated in Pennsylvania for bunt control. In 1924 I put on four demonstrations on bunt control with copper carbonate dust. As a result something over 1000 bushels of wheat was treated.

In 1925 I attempted to put on a real drive to have wheat treated with copper carbonate dust. However, realizing that the success of the treatment depended on having every kernel of wheat covered with the dust the first drive was to have proper machines built in which to do the treating. The thirty-gallon diagonal-axle barrel was the one that was recommended. About 50 of these were constructed according to our specifications by farm bureaus, grain dealers, millers, and farmers, and practically all the wheat was treated in these machines this year. In addition, one large commercial treating machine was brought into the state. Approximately two tons of high grade copper carbonate dust was brought into the state this year for use in bunt control. Through our records and those of the county agents we know that at least 32,000 bushels of wheat was treated for bunt control with high grade copper carbonate dust. In addition to the above some 200 bushels of wheat were treated with formaldehyde, 100 bushels with uspulun soak treatment and 20 bushels with colloidal copper dust. (Kirby)

Delaware: The general heavy infection favored interest in control and 8 demonstrations were held. The loss in yield and dockage experienced by growers established general interest, especially in the control by dust disinfectants.

The use of copper carbonate introduced along with other dust disinfectants for the first time. Orders for 2000 pounds of copper carbonate are known, and probably 2500 pounds were used in the state. (Adams)

Maryland: About 5000 bushels were treated in 1925. (Jehle)

Virginia: Copper carbonate is being used extensively this year in practically all parts of the state. We have carried on an extension campaign which has met with exceptional success. There has been a great need as bunt has been more prevalent than in any other year of my ten years' experience in the state. Our latest records show that 10,000 pounds of copper carbonate were used for treatment of wheat. We believe that this figure could have been doubled if copper carbonate had been available to supply the demands. (Fromme)

West Virginia: Copper carbonate not used. (Giddings)

Kentucky: Copper carbonate probably used only to a very slight extent as we have no extension service in plant pathology. (Valleau)

North Carolina: With regard to the control of bunt of wheat, copper carbonate dust was used to some extent this year, this being the first season when there was any demand for the chemical. Approximately 30 pounds are known to have been used, which amount probably includes all that was applied. Bunt has not been of any severity in the wheat crop during the past two seasons. Still a good many of the wheat growers are in the habit of soaking their grain in bluestone or formaldehyde before planting. It is likely that the new dry method will replace the old wet ones. (Fant)

Louisiana: None used. (Edgerton)

Arkansas: No information. (Rosen)

Ohio: Probably about 30,000 pounds of copper carbonate used. (Thomas)

Indiana: Copper carbonate treatment well known and extensively used About 6,000 bushels were treated in 1925. (Gregory)

Illinois: Up to the present time, copper carbonate is being used to but a slight extent for treating bunt. In the St. Louis area it has been used to considerable extent for treating flag smut, but I understand also that it is not being done as much as in the past when the treatment was more or less compulsory. This treatment for bunt seems to be effective, but is not being used very much because (a) it has not been given much publicity, (b) very few farmers or farm bureaus have mixing machines for applying it, and (c) many who have used it do not like it very well because of the irritating properties of the dust. (Tehon)

Wisconsin: Do not know of any used. (Vaughan)

Iowa: Very little of this material needed. We know of five farmers who treated their seed with absolute control. (Dept. Plant Path.)

North Dakota: Not generally used. Has not replaced formaldehyde. Probably about two tons used. (Brentzel)

Nebraska: Eleven counties where demonstrational work was carried on used 5,000 pounds of copper carbonate. (Peltier)

Kansas: Seed for about 300,000 acres treated with copper carbonate this year. (Melchers)

Colorado: Copper carbonate not used until this year. The following campaign demonstrated that amounts of copper carbonate in stock in the various chemical concerns was used up and that these imported several additional carloads which were sold. (Durrell)

Arizona: Graham County reports copper carbonate seed treatment as satisfactory. (Streets)

Idaho: In the Palouse region of northern Idaho copper carbonate has become rather popular. About one-fourth of the wheat seeded in this region was thus treated. (Hungerford)

Oregon: Eighty per cent of the wheat acreage treated with copper carbonate, probably 112,000 pounds of copper carbonate were used. (Jackman & Barss)

California: Universally used. (Mackie)

Recent literature on bunt and its control:

Other references dealing with seed treatment of cereals in general will be found on page 304.

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14. Mullett, H. A. Wheat pickling. The new dry process. Jour. Dept. Agr. Victoria 23: 283-288. May 1925.

15. Neill, J. C. Stinking-smut of wheat II. Field experiments on control. New Zealand Jour. Agr. 30: 302-313. May 1925.

16. ------------ Stinking smut of wheat III. Field germination of seed treated with formalin and Clarke's wheat protector. New Zealand Jour. Agr. 31: 24-25. July 1925.

17. Quodling, H. C. Pickling wheat with carbonate of copper. Queensland Agr. Jour. 23: 456-457. Nov. 1925.

18. Ramsey, A. A. Variations in samples of copper carbonate. Agr. Gaz. New South Wales 36: 482-484. 1925.

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20. Thomas, R. C. Control of smuts of wheat and oats with special reference to dust treatments. Ohio Agr. Exp. Sta. Bul. 390: 405-423. Dec. 1925.

21. Tisdale, W. H., J. H. Martin, et al. Relative resistance of wheat to bunt in the Pacific Coast States. U. S. Dept. Agr. Bul. 1299: 1-30. 1925.

LOOSE SMUT CAUSED BY USTILAGO TRITICI (PERS.) ROSTR.

Only three states, Pennsylvania, Minnesota, and Nebraska, reported more than the usual amount of loose smut. The majority of the other states reported it as less than or about as usual. Practically all other states mentioned it as being generally distributed, but in Indiana and Illinois it was mostly reported from the central counties, and in Idaho it was said to be important in spring wheat under irrigation. In the Pacific Coast States the disease was of no importance except in the case of a few unimportant varieties. H. P. Barss reports that,

> "It has a tendency to die out under Oregon conditions. In Morrow County it occurred only in Marquis wheat from Montana seed."

W. W. Mackie stated that,

> "Loose smut is so rare in California that only an expert can find it. This year was no exception."

The maximum amounts found in individual fields were reported as follows: 25 per cent Utah; 20 per cent Minnesota, Ohio; 17 per cent Pennsylvania; 14 per cent Virginia; 10 per cent West Virginia and Arkansas; 7 per cent Michigan; 6 per cent Arizona; and 3 per cent Kansas.

The estimated average loss by states as given are shown in table 77.

Table 77. Estimated percentage loss from loose smut of wheat, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
4	Arkansas	1.5	New York, Ohio, Nebraska, Utah, Idaho
3.4	Virginia		
3	Maryland	1	New Jersey, South Carolina, Indiana, Minnesota, Missouri
2.5	Michigan		
2.1	Pennsylvania		
2.	Connecticut, West Virginia, North Carolina, Georgia, North Dakota, South Dakota, Kentucky	0.5	Delaware, Illinois, Arizona
		0.25	Kansas

In a paper on susceptibility of wheat varieties and selections to loose smut presented at the Kansas City Meeting in December, F. D. Fromme (4) reported that inoculations of the florets of the varieties Stoner and Leap produced 62 per cent infected plants of Stoner and only 3 per cent infected plants of Leap. Within the variety Fulcaster various races were found, some of which were very susceptible to loose smut, others moderately so, and some highly resistant. The probability of developing a highly resistant strain of Fulcaster through pure line selections is indicated.

Reports of collaborators on varietal susceptibility follow:

Pennsylvania: Leap most resistant variety, Forward is showing more susceptibility than heretofore. Pennsylvania 44 and Red Rock are the most susceptible. (Kirby).

Kentucky: On the Experiment Station Farm Currells Prolific, which has usually had about 5 or 6 per cent, was practically free while Michigan Amber grown next to it for the last two years had the usual 5 or 6 per cent. (Valleau)

Indiana: Trumbull wheat is apparently immune. (Gregory)

Minnesota: Prelude and Kota very susceptible. The usual amount appeared in Marquis and the amount in Kota seems to be increasing, an average field containing about 10 per cent. (Sect. Plant Path.)

North Dakota: Kota and Monad very susceptible. (Brentzel)

Kansas: Hard varieties of wheat always have the least amount of loose smut. (Melchers)

Recent literature:

1. Anon. Die elektrische Heisswasserbeize, eine neue Möglichkeit zur Bekämpfung der Blüteninfektionen. (The electrical hot water steeping apparatus, a new possibility for the control of blossom infections.) Tech. Landw. 6: 47. 1925.

2. Conners, I. L. Organic mercury compounds for the control of loose smuts of wheat and barley and barley stripe. (Abstract) Phytopath. 16: 63-64. Jan. 1926.

3. Elkar, H. Die Anwendung des Appel'schen Heisswasserbeizapparates gegen Flugbrand auf Grund 4jähriger Erfahrungen im praktischen landw. Betriebe. Pflanzenbau. 1924/25: 258-259. Feb. 1, 1925.

4. Fromme, F. D. Susceptibility of wheat varieties and selections to loose smut. (Abstract) Phytopath. 16: 86-87. Jan. 1926.

5. Neill, J. C. Loose smut of wheat. II. Field experiments on seed disinfection by hot water. New Zealand Jour. Agr. 30: 167-174. March 1925.

6. ----------- Loose smut of wheat. III. A comparison in germination and percentage infection between "firsts" and "seconds" seed. New Zealand Jour. Agr. 31: 161-163. Sept. 1925.

7. Tapke, V. F. Single-bath hot-water and steam treatments of seed wheat for the control of loose smut. U. S. Dept. Agr. Bul. 1383: 1-28. March 1926.

FLAG SMUT CAUSED BY UROCYSTIS TRITICI KOERN.

In the United States flag smut is known to occur only in the three states of Illinois, Missouri, and Kansas. The following reports concerning the situation in those states have been received:

Illinois: Inspections were made in 31 counties during May and June in which a total of 3,470 fields were inspected and a total of 45 fields were found infested. A complete survey was not attempted in the generally infested areas in Madison and St. Clair Counties. A complete survey of these counties would, no doubt, have run the number of infested fields up to three or four hundred. The infestation a year ago was very light, due, no doubt, to the severe winter of 1923-24 which resulted in heavy winter killing of wheat. The degree of infestation this year was somewhat heavier than last year, indicating that the disease is again on the increase.

No flag smut was found in Greene, Jersey, and Washington Counties this year. Last year 4 infested fields were found in Greene County, 1 in Jersey County, and 1 in Washington County. Year before last 13 infestations were found in Jersey County. The apparent eradication of the disease in this county is due, no doubt, to unfavorable climatic conditions and especially to the last two cold winters.

In the northern part of Monroe County, in which a number of infested fields were found two years ago, one infested field was found this year. About the same number of infested fields were found in Logan County this year as last. There is a small Canadian Hybrid which is susceptible to the disease. We have not been able to get growers to change to the resistant varieties.

In Madison County, out of an inspection of 268 fields, 25 fields were found infested, all limited to the old infested area. In St. Clair County there was a total of 303 fields inspected. Ten of these fields were found infested inside of the old infested area. One infested field was found outside of the old area toward the northeastern part of the county. The infestation in all but about four or five fields was very light, requiring considerable search in order to find it. In one field in St. Clair County, which was so badly infested the first year, the infestation ran about 25 per cent in Fultz wheat this year. One or two other fields in the wooded area of St. Clair County had an infestation of 1 per cent or more. There was only one field found in Madison County which would run 1 per cent or more, one in Scott County, and one in Logan County.

As a result of the six year observations made in flag smut work, I am of the opinion that it will not prove to be a very serious disease in Illinois, but it may occasionally cause considerable loss in isolated fields on farms on which rotation has not been practiced and resistant varieties of wheat have not been sown. (P. A. Glenn)

Missouri: Our men were not able to do any scouting work for flag smut. We have likewise received no inquiries or complaints from county agents or farmers, even in the previously known infested areas. (Leonard Haseman)

Kansas: A survey of Leavenworth County, where this disease has been the most common in other years, showed that in 1925 less flag smut was present. The fields where it occurred showed from a trace to 5 per cent. In one or two instances parts of fields had 15 to 20 per cent but the average for the fields would not run over 5 per cent. This smut cannot be said to be spreading at an alarming rate, in fact it seems less prevalent than 3 years ago. (Melchers)

Recent literature:

1. Carne, W. M. Cereal smuts. Jour. Dept. Agr. Western Australia II. 2: 10-19. March 1925.
An observation concerning flag smut during the past three or four years is the apparent resistance of Nabawa. The resistance of Florence and Yandilla King is also indicated.

STEM RUST CAUSED BY PUCCINIA GRAMINIS PERS.

More or less stem rust occurred widely and scatteringly over the country but it was only in the spring wheat states, especially Minnesota, North Dakota, and South Dakota, and also in California, as well as in certain localized areas in some of the winter wheat states, that it occurred in sufficient abundance to do much damage. In their reports to the Plant Disease Survey; quoted below, several collaborators have given information of general interest concerning local distribution of the rust within their states.

Pennsylvania: Generally distributed but severe injury confined to areas in the southeast near barberries. (Kirby)

Virginia: Occurred in southwestern Virginia in the area where *Berberis canadensis* occurs. (Fromme)

North Carolina: Specimens were received from Madison County, which is located in the mountains, and similar specimens have been received from this general section during the past years. Stem rust apparently does not occur in the rather extensive wheat section in the Piedmont area but is confined to the higher altitudes of the mountains. (Fant)

Indiana: A mere trace found in places indicated on the map (six counties in southern Indiana). (W. E. Leer)

Illinois: General throughout state but heaviest on winter wheat in southeast and on spring wheat in extreme north. (Tehon)

Michigan: In southern part of the state there was a very small amount of rust but in the northern part some fields were a complete loss. In the northern part of the lower peninsula where barberries have not been removed local epidemics were found which completely destroyed certain fields. (Nelson)

Wisconsin: Statewide, mostly in the vicinity of wild barberries. The southeastern areas had very little rust. (Vaughan)

Minnesota: General but not severe in west central portion of the state. (Sect. Plant Path.)

North Dakota: From maps furnished by G. C. Mayoue and D. G. Fletcher it appears that the greatest damage occurred to bread wheat in the eastern part of the state in the Red River Valley.

South Dakota: For the western half of the state the yield and quality of wheat were high while losses due to stem rust were sporadic and slight. The eastern half of the state, however, had a considerable loss which in some areas has been estimated to be as high as 15 per cent for some varieties. ***** The central part of this area was the hardest hit and an arm-like area extending to the northern limit of the state suffered considerable loss. To the southward the loss was less marked. (E. J. Petry)

Certain areas in the state, especially in the vicinity of Mitchell, Huron, and Redfield showed the heaviest stem rust infection; other portions of the state, especially those in western South Dakota in which crops were splendid this year, showed no noticeable rust infection. (R. O. Bulger)

Nebraska: Amounts ranging from a trace of rust in the east to 1 per cent on spring wheat in the west. (Peltier)

Kansas: Most fields in the state did not even show a trace. Only in rare instances did we find a field where 0.5 to 1 per cent occurred. Even up in northwest Kansas where stem rust usually occurs when it appears in Kansas at all, practically none was present, at least not in amounts to cause an appreciable injury. (Melchers)

Texas: Occurred practically all over the state. Severity was slight, so, although prevalence was considerable, there was little or no shriveling of grain. (Wallace Butler)

Wyoming: Spring wheat in Crooks County showed a loss of 5 to 10 per cent in the eastern half; for the whole county the rust loss was about 2 per cent. Spring wheat in Fremont County showed a rust loss of about 5 per cent; elsewhere in the state there was no loss from rust in spring wheat. (R. U. Cotter)

Colorado: A general sprinkling of rust entered eastern Colorado the latter part of June but did not develop sufficiently to do any damage. (Lungren)

Idaho: Some damage in irrigated section. (Hungerford)

California: Appeared sporadically in a number of areas but was worst in the northern Sacramento Valley. (Mackie)

Concerning prevalence as compared with other years, collaborators in the spring wheat area - North Dakota, South Dakota, and Minnesota, and in Wisconsin, Utah, and California, reported more than the average and more than last year. In the spring wheat area, the disease was epidemic. The outbreak, however, was not so extensive nor so severe as that in 1923. A comparison of the estimates of losses for the two years shows that in 1923 they were greater in the spring wheat area and also in other states, particularly Montana and Colorado. The average loss for the United States in 1923 was estimated at 4.07, whereas in 1925 it will probably not exceed 2 per cent.

The relation of barberries to stem rust in Virginia and data on losses in individual fields is reported by F. D. Fromme as follows:

"A trip to the Jackson's Ferry and Foster Falls section of Wythe County, Va., was made on June 24, 1924, and a study was made of the relation between the occurrence of barberries and stem rust of wheat. Severe infection of stem rust was found in those localities and also at points along the Lee Highway between Wytheville and Pulaski. The injury was strikingly correlated with the presence of barberries in all cases, and comparative freedom from injury was always associated with the absence of barberries.

"Representative samples of wheat, all of the Fulcaster type, were obtained from a number of fields, and these were made up into bundles of uniform size for purposes of comparison. Comparative yields were obtained by threshing 20 heads from each sample and weighing the grain obtained.

"*** A comparison of the average yield, as well as the individual yields, in the severely infected fields with the yields of the slightly infected and clean fields shows in a very striking way the injury from stem rust. The severely infected fields show an average of only 3.98 grams of grain in 20 heads as compared with 15.75 in the slightly infected fields and 18.4 in the field with no infection. The percentage reduction in the slightly infected fields is 14.4 while that in the severely infected fields is 78.4. The one moderately infected field shows a yield of 11.7 grams and a percentage reduction of 36.4.

"A number of oat fields in close proximity to the wheat fields and to barberries were examined but only slight infection of stem rust was found. Rye was practically free from infection, a trace only being seen. Considerable stem rust was found on two grasses which are common in the section, orchard grass, *Dactylis glomerata*, and cheat, *Bromus secalinus*."

Table 78. Estimated reduction in yield due to stem rust in 1925.

Percentage loss	States reporting	Percentage loss	States reporting
11	Minnesota	Trace	Maine, New York, Maryland, West Virginia, Indiana, Illinois, Nebraska, Kansas, Louisiana, Texas, Arkansas, Montana, Wyoming, Colorado, Arizona, Washington, Oregon
7.5	South Dakota		
5	North Dakota, California		
3.5	Wisconsin		
1	Utah, Idaho		
0.5	North Carolina, Michigan		
0.3	Virginia		
0.25	Connecticut		
0.2	Pennsylvania		
0.1	Ohio, Iowa, Kentucky		

Tables giving the dates of earliest appearance of rust both on barberry and on cereals and grasses have already been given in the Plant Disease Reporter (Vol. 9: 18-19, July 1, 1925). Certain other data have been received since that time, however, and the accompanying table 79 showing dates and places of earliest observations of stem rust on wheat in various states is given.

Table 79. Dates of first appearance of stem rust on wheat, 1925.

Date	State	Place	Date	State	Place
May 1	Arizona	Maricopa Co.	June 12-13	Kansas	Republic Co.
May 7	Texas	Brazos Co.	June 15	Minnesota	Kitson Co.
June 4	Illinois	Jersey Co.	June 20	Michigan	Wexford Co.
June 8	Nebraska	Richardson Co.	June 23	Colorado	Kit Carson Co.
June 10	Ohio	Prebel Co.	June 25	Indiana	Martin Co.
June 11	Pennsylvania	Cumberland Co.			

During the year, the barberry eradication campaign continued in the same thirteen states. A complete report of this work for 1925, prepared by F. E. Kempton, has appeared in the Cereal Courier (17: 415-443, December 31, 1925). In this the following summarized statement is made regarding survey and eradication work.

> "During the calendar year 1925, approximately 57 counties were covered in original survey and approximately 56 counties were surveyed a second time. In continuing the resurvey, about 160 counties were covered. Original bushes numbering 142,550 were found on 3,985 properties, and 149,822 bushes were destroyed on 4,119 properties. These totals include 55,485 bushes found on 1,092 properties in second survey. In resurvey, 17,036 sprouting bushes were found and 17,141 were eradicated. Seedlings numbering 701,796 were found in original survey, second survey, and resurvey."

At the Kansas City meeting, three papers dealing with control of cereal rusts by sulfur dust were given (1,11,12). All of the authors seem to agree that it was possible to control rusts by dusts with sulfur if enough applications were made, but from results presented so far the practicability of this method is yet to be demonstrated. Three applications of sulfur per week were needed to control stem rust in Manitoba, according to Bailey and Greaney (1), In Minnesota in some experiments one application seemed to control, while in others as many as five applications were practically ineffective, and Lambert and Stakman (12) report that in years of severe epidemics in the hard spring wheat area it would be necessary to begin dusting when the grain is in flower or earlier and continue until the hard-dough stage, thus necessitating 5 or 6 applications. Kightlinger and Whetzel (11) increased the yield of wheat by 18.5 per cent by making applications of sulfur dust. The rust controlled in their experiments, however, was leaf rust rather than stem rust.

Recent literature:

1. Bailey, D. L., and F. J. Greaney. Preliminary experiments on the control of leaf and stem rusts of wheat by sulfur dust. Phytopath. 16: 64. Jan. 1926.

2. ---------------- Preliminary experiments on the control of leaf and stem rusts of wheat by sulphur dust. Scient. Agr. 6: 113-117. Dec. 1925.

3. Desprez, F. Observations sur la rouille. (Observations on rusts.) Jour. d'Agr. Prat. 89: 118-120. 1925.

4. Harrington, J. B. The inheritance of resistance to Puccinia graminis in crosses between varieties of durum wheat. Scient. Agr. 5: 265-288. 1925.

5. Hayes, H. K., E. C. Stakman, and O. S. Aamodt. Inheritance in wheat of resistance to black stem rust. Phytopath. 15: 371-387. 1925.

6. Jackson, V. W., W. P. Fraser, and D. L. Bailey. The present status of the barberry eradication campaign in western Canada. Scient. Agr. 5: 375-378. Aug. 1925.

7. Kempton, F. E. Barberry eradication as a method of reducing stem rust losses of small grains. Rept. Proc. Tenth Ann. Blister Rust Conf., Washington, D. C., Feb. 18-23, 1925: 35-60. 1925.

8. ----------- G. C. Curran, and E. D. Griffin. Barberry eradication in Illinois. Trans. Illinois State Acad. Sci. 16 (1923): 198-209. 1923.

9. ----------- and N. F. Thompson. The common barberry and how to kill it. U. S. Dept. Agr. Circ. 356: 1-4. July 1925.

10. Kent, J. K. Eradicating common barberry in Iowa. Iowa Agr. 25: 225-226. Feb. 1925.

11. Kightlinger, C. V. and H. H. Whetzel. Second report on dusting for cereal rusts. Phytopath. 16: 64. Jan. 1926.

12. Lambert, E. B., and E. C. Stakman. Effect of sulfur dust on the development of black stem rust of wheat in a natural epidemic. (Abstract) Phytopath. 16: 64-65. Jan. 1926.

13. Schmidt, D. Eradication of common barberry is best black rust prevention. Seed World 17 (3): 9. Jan. 30, 1925.

14. Schulz, E. R., and N. F. Thompson. Some effects of sodium arsenite when used to kill the common barberry. U. S. Dept. Agr. Bul. 1316: 1-18. 1925.

15. Stakman, E. C., M. N. Levine, and F. Griffee. Webster, a common wheat resistant to black stem rust. Phytopath. 15: 691-698. Nov. 1925.

16. Thompson, Walter P. Cytological conditions in wheat in relation to the rust problem. Scient. Agr. 5: 237-239. April 1925.

17. Walker, W. A., and N. F. Thompson. Black stem rust and the progress of barberry eradication in Wisconsin. Bul. Dept. Agr. Wisconsin 68: 1-24. May 1925.

LEAF RUST CAUSED BY PUCCINIA TRITICINA ERIKS.

Leaf rust was of much less importance last year than usual. The only states indicating more prevalence of rust were Wisconsin, North Dakota, Colorado, Utah, Oregon, and California. Collaborators in other states, especially those in the East, reported much less than the average.

Table 80. Estimated percentage losses from leaf rust, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
5	Iowa, North Carolina	0.5	Arizona, Texas
1.5	New York, Illinois	0.3	Pennsylvania
1.	Wisconsin, Tennessee, California	0.25	Connecticut
		0.1	Ohio, Kentucky

Several collaborators mention the fact that the disease appeared very late in the season with the result that only slight damage occurred. They also state that the dry spring probably was responsible for holding the disease in check. In Indiana, E. B. Mains reported that apparently the amount of overwintering material was greatly reduced in February and the dry spring delayed development. A glance at the table showing departures from normal precipitation (Plant Disease Reporter, Suppl. 45: I, 1926) will show that the months of April, May, and June were unusually dry, especially in the eastern part of the country. During the month of May the precipitation

was below normal for all wheat states except Oregon and California and it so happens that these are two of the states that mention leaf rust as being more prevalent than the average year. Prolonged spring rains are thought to be responsible, according to H. P. Barss of Oregon.

Dates of earliest appearance:

Jan. 1	Tarrant County	Texas
Feb.	Clark County	Georgia
April		California
May 1	Fayette County	Kentucky
May 3	Rice County	Minnesota
May 8	Sangamon County	Illinois
May 19	Boone County	Missouri
June 6	Genesee County	New York
June 9	Chester County	Pennsylvania
June 23	Kit Carson County	Colorado

Wallace Butler mentions the fact that durum wheats are resistant in Texas.

Recent literature (See also literature under stem rust):

1. Kightlinger, C. V. Preliminary studies on the control of cereal rusts by dusting. Phytopath. 15: 611-613. Oct. 1925.

2. ----------- and H. H. Whetzel. Second report on dusting for cereal rusts. (Abstract) Phytopath. 16: 64. Jan. 1926.

3. Maresquelle, H. J. Compte rendu des rouilles des blés à Bellevue en 1924. (Wheat rust at Bellevue, near Paris, 1924.) Rev. Path. Vég. et Entoml. Agr. 12: 56-57. 1925.

STRIPE RUST CAUSED BY PUCCINIA GLUMARUM (SCHM.) ERIKS. & HENN.

Traces of stripe rust were reported from Utah, Idaho, Washington, and Oregon but in no state was the disease said to be of any particular importance.

Recent literature:

1. Desprez, F. Observations sur la rouille. (Observations on rust.) Journ. Agr. Prat. 89: 118-120. 1925.

2. Ducomet, V. Nouvelles observations sur les rouilles. (Further notes on rusts.) Rev. Path. Vég. et Entoml. Agr. 12: 60-64. 1925.

SCAB CAUSED BY GIBBERELLA SAUBINETTI (MONT.) SACC.

Practically all states are unanimous in reporting much less scab than the average year or last year. However, in the spring wheat areas of Wisconsin,

Minnesota, and North Dakota the disease was of considerable importance. In Minnesota it was reported as causing about 2 per cent loss, and was most severe in the southern and west central parts of the state. In North Dakota it occurred in the eastern section, and 1 per cent loss was estimated.

A glance at the figures showing departures from the normal precipitation for May and June show that those two months were much drier than normal. June in Wisconsin, Minnesota, and North Dakota, however, was wet, which probably accounted for the prevalence of the disease on some of the spring wheat in those states. A map showing the precipitation for June 1925 (Fig. 4), brings out the fact that southern and western Minnesota, northeastern South Dakota, and southeastern North Dakota had more than 6 inches of rainfall during this month. This amount of moisture coming at the time of heading would probably favor scab infection.

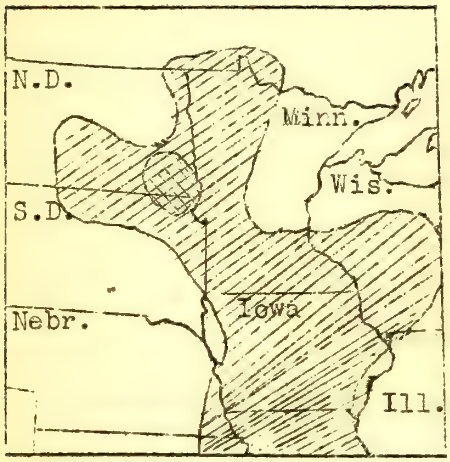

Fig. 4. Spring wheat area where total June rainfall equalled or exceeded six inches, 1925.

Dates of earliest observations:

June	Delaware	Kent County
June 9	Pennsylvania	Chester County
June 23	Illinois	Piatt County
June 30	Minnesota	Carver County
June 30	Wisconsin	Dane County
July 22	North Dakota	Cass County.

Table 81. Estimated percentage reduction in yield due to wheat scab during 1925.

Percentage: loss	States reporting	Percentage: loss	States reporting
2	Minnesota	0.1	Ohio, Kentucky
1	North Dakota, North Carolina	Trace	New York, Delaware, Virginia, West Virginia, Indiana, Michigan, Wisconsin, Iowa, Missouri, Tennessee
0.7	Pennsylvania		
0.6	Illinois		
0.5	New Jersey, Maryland		

NEMATODE, TYLENCHUS TRITICI (STEIN.) BAST.

The only states reporting wheat nematode in 1925 were Virginia, West Virginia, and North Carolina. In the former state it occurred in about average amounts, causing loss than 1 per cent reduction in yield. Fromme and Godkin reported one case where a 20 per cent loss occurred in a field from clean wheat sown on land that had borne a slightly diseased crop last year. In West Virginia it was of only minor importance, occurring only in the southeastern section bordering Virginia. In North Carolina the disease was found on four farms in Lincoln County, June 10. It is thought to occur in several of the Piedmont and mountain counties of the state, according to Lehman.

During the past year two secondary diseases, associated with nematode injury have been reported from abroad. Fahmy and Mikhail (2) have reported a bacterial disease caused by Pseudomonas tritici Hutch. occurring widely throughout lower Egypt. It is thought to be of Indian origin and is causing considerable trouble in the Huidi variety of wheat in the lower region. It is associated with the nematode, attacking the plant following injury by that organism, and being disseminated largely by the eelworms. Out of 100 heads attacked by this bacterium no grain was obtained, while out of 100 heads infected by eelworms alone, 27 grams of wheat was harvested as compared with 82 grams from 100 healthy heads.

The other disease which is associated with nematode injury and the organism of which is disseminated by the nematodes is that reported by Atanasoff (1). The fungus Dilophospora alopecuri has been known in Europe for nearly a century and has always been noted in association with nematode infection. Atanasoff maintains that when the spores come into contact with the Tylenchus larvae they become firmly attached to it by means of the spore bristles and are carried between the leaf sheathes of the young plant to a point near the growing apex, where they germinate and parasitize the young leaves, weakened by the feeding of the larvae. In itself this fungus appears to be non-parasitic, but associated with the nematode it damages the plants.

Recent literature:

1. Atanasoff, D. The Dilophospora disease of cereals. Phytopath. 15: 11-40. 1925.

2. Fahmy, T., and T. Mikhail. The bacterial disease of wheat caused by Pseudomonas tritici (Hutchinson). Agr. Jour. Egypt, New Annual Series 1923, 1: 64-72. 1925.

3. Pape, Heinrich. Ein neuer Fundort der Federbuschsporenkrankheite des weizens in Deutschland (Mit einer Uebersicht über das bisherige Auftreten der Krankheit an Getreide in Deutschland) Illustr. Landw. Zeit. 45: 482-484. Sept. 1925.

ERGOT CAUSED BY CLAVICEPS PURPUREA (FR.) TUL.

Ergot was reported on wheat from Minnesota, North and South Dakota, and Nebraska. Since durum wheat seems to be especially susceptible it is not unlikely that most of the reports in these states concern it. The statement is made that in North Dakota it was too cool and wet at blossom time to favor infection and that no epidemic has occurred since 1921 when it was serious. The losses for this year amount to only a trace.

ANTHRACNOSE CAUSED BY COLLETOTRICHUM GRAMINICOLUM (CES.) WILS.

Anthracnose was reported from New York southwestward to Tennessee and westward to Wisconsin and Ohio. Of the 14 states reporting on cereal diseases west of the Mississippi River, only one, Iowa, reported any anthracnose and that was a bare trace. In none of the states was it of any economic importance

this year and in the majority of them it was less serious than usual. It was mentioned by the collaborator in Pennsylvania that dry weather greatly reduced the amount of injury, and it is probable that this was true for other eastern states where anthracnose occurred.

GLUME BLOTCH CAUSED BY SEPTORIA NODORUM BERK.

Seventeen states, for the most part in the eastern and north central portions of the country, reported glume blotch. The only state west of the 100th meridian reporting it was California, where it was said to be worse than usual, causing shriveling of kernels. In no state were the losses heavy. Pennsylvania and North Carolina reported 1 per cent loss and New York from a trace to 0.5 per cent. All other states indicated that it was of very slight importance and the losses averaged only a trace. The first report of the occurrence of this disease in Maine was received in 1925. Dry weather was thought to be responsible for the decreased amounts of this disease in the majority of the states.

Dates of earliest appearance:

June 4	Pennsylvania	Chester County
July 12	North Dakota	Cass County
July 25	New York	Yates County
July	Minnesota	Ramsey County

In California, W. W. Mackie reported great varietal variation. Some wheats were free from attack while others growing beside them showed 100 per cent infection.

SPECKLED LEAF BLOTCH CAUSED BY SEPTORIA TRITICI DESM.

This wheat disease was reported from New York, Pennsylvania, Maryland, Virginia, Tennessee, Arkansas, Illinois, Wisconsin, Minnesota, South Dakota, Kansas, Idaho, and California. Most of the collaborators reporting mention it as being less prevalent than usual and it was suggested by some of them that dry warm weather probably was unfavorable to its development. May and June were dry months. May was cooler than normal, however, but June was for the most part warmer than normal in eastern United States. Speckled leaf blotch was of only slight economic importance, practically all states reporting only a trace of loss. According to Tehon, it is usually very prevalent in Illinois, but in 1925 it was almost absent.

BLACK CHAFF CAUSED BY BACTERIUM TRANSLUCENS UNDULOSUM SMITH, JONES, & REDDY

Black chaff was reported west of the Mississippi River in the Great Plains states from Minnesota and Montana to Arkansas and Oklahoma. It was

also reported from Idaho, and it occurred in the Experiment Station plots at Madison, Wisconsin, and in one field in Illinois. In most states there was less or about the same amount as usual although North Dakota and Montana reported more than last year, with 1 and 2 per cent losses respectively. In general the disease was relatively unimportant.

> North Dakota: I noted quite a little black chaff in the eastern part of the state. I should say that in some fields the infection was between 50 and 75 per cent. I only found it in a few fields in the southeastern part of the state. (G. C. Mayoue)

Dates of earliest appearance as reported by collaborators were June, Altamont, South Dakota; June 27, Christine, North Dakota; June 30, Chaska, Minnesota; and July 6, Piatt County, Illinois.

Collaborators in Minnesota and North Dakota report Kota as susceptible.

POWDERY MILDEW CAUSED BY ERYSIPHE GRAMINIS DC.

This disease was reported widely in various parts of the country from New York and Virginia westward to Oregon and California, but for the most part it was, as usual, only a very slight factor in reducing the yield of wheat; however, in Pennsylvania and Maryland 0.3 and 0.5 per cent losses were reported, and in South Dakota, Kansas, and California it was mentioned as being more prevalent than usual. In Kansas it was very common in some fields and in some instances seemed to be doing some damage. It was not widespread enough, however, to affect the yield of the crop in the state. In California it was very abundant this year, and, according to W. W. Mackie, caused considerable loss by its late attack, destroying leaves and weakening the plants.

In Wisconsin, according to Vaughan, it was only noted on winter wheat and late in the fall. In Indiana, E. B. Mains reported that in the field it seldom was seen but in the greenhouse it was very troublesome in wheat investigations. He noted marked differences in the susceptibility of varieties. Norka, C. I. 4377, Khapli emmer, and a strain of Michigan Amber showed marked resistance.

TAKE-ALL CAUSED BY OPHIOBOLUS GRAMINIS SACC.

Take-all in 1925 was reported to the Plant Disease Survey from New York, North Carolina, Kansas, and Oregon. In New York it was considered as unimportant and caused less than 1 per cent reduction in yield. In North Carolina, according to G. W. Fant, it was found in an additional county, making a total of six counties in the state from which specimens have been collected. He estimates that it probably caused about one-half of one per cent reduction in yield for the state. The new occurrence was near Mocksville in Davie County. In Kansas the disease was identified by Hurley Fellows in the following counties: Riley, Dickinson, Marion, Harvey, McPherson, Rice, and Barton. He also made examinations in Reno and Saline Counties but found no take-all. Another Kansas

occurrence was noted by C. O. Johnson in Kiowa County, and a specimen was received at Manhattan from Ellis County.

In Oregon, Barss reported more take-all than last year and stated that it was important where it occurred. The reduction in yield for the state, however, was not more than a trace. Some fields where wheat followed grass on clover sod showed much more than others where wheat was the preceding crop. In California, W. W. Mackie reported as follows:

> "Foot rot (apparently Ophiobolus) was universal and very destructive. Hard Federation, White Federation, and Federation varieties were particularly susceptible, but none were immune. It caused sterility of flowers, shriveling of kernels, and death of plants from the seedling stage to maturity."

The disease is considered very important in the state, and it is estimated that it caused about 10 per cent loss. As indicated in Mackie's report, it is not certain that this is entirely the take-all disease caused by Ophiobolus; other things may be associated with it.

During the past two years take-all has been found causing considerable loss in a large number of spring wheat fields of northwestern Saskatchewan, Canada, as reported by Frazer, Simmonds, and Russell (3) at the Kansas City meeting of the American Phytopathological Society. They reported that the fungus seems to be indigenous to the area and is parasitic on a number of native grasses, particularly those with rhizomes. They found the disease occurring on land which had never before been planted to wheat.

Recent literature:

1. Davis, R. J. Studies on Ophiobolus graminis Sacc. and the take-all disease of wheat. Jour. Agr. Res. 31: 801-825. Nov. 1, 1925.

2. Fellows, Hurley. The influence of carbon dioxide and oxygen on the growth of Ophiobolus graminis in pure culture. (Abstract) Phytopath. 16: 81. Jan. 1926.

3. Frazer, W. P., P. M. Simmonds, and R. C. Russell. The take-all disease in Canada. (Abstract) Phytopath. 16: 80-81. Jan. 1926.

4. Guyot, L. De l'existence de formes pycnidiennes chez Ophiobolus graminis Sacc., et Ophiobolus herpotrichus (Fr.) Sacc. Rev. Path. Vég. & Entom. Agr. 12: 74-81. Jan.-Mar. 1925.

5. Kirby, R. S. The take-all disease of cereals and grasses caused by Ophiobolus cariceti (Berk. & Broome) Sacc. New York (Cornell) Agr. Exp. Sta. Mem. 88: 3-45. 1925.

6. McKinney, H. H., and R. J. Davis. Preliminary environmental studies of the take-all disease of wheat caused by Ophiobolus graminis Sacc. Phytopath. 15: 494-495. 1925.

7. McKinney, H. H., and R. J. Davis. Influence of soil temperature and moisture on infection of young wheat plants by Ophiobolus graminis. Jour. Agr. Res. 31: 827-840. Nov. 1, 1925.

8. ----------- Foot-rot diseases of wheat in America. U. S. Dept. Agr. Bul. 1347: 1-40. Nov. 1925.

9. Melchers, L. E., and M. C. Sewell. The effect of tillage, fertilizers, and rotations on the spread of wheat foot rot. (Abstract) Phytopath. 16: 81. Jan. 1926.

10. Sewell, M. C., and L. E. Melchers. The effect of rotation and tillage on foot rot of wheat in Kansas 1920-1924. Jour. Amer. Soc. Agron. 16: 768-771. 1924.

FOOTROT CAUSED BY HELMINTHOSPORIUM SATIVUM PAM., KING, & BAK.

This disease was reported principally from the upper Mississippi and Missouri Valley states, although, according to collaborators, traces occurred in New York, Pennsylvania, Maryland, and California. North Dakota and Kansas reported losses of one percent, but all other states reported less than one per cent.injury. In Wisconsin it was reported only on seedlings growing in the experimental plots at Madison. In North Dakota it was noted as rootrot, blotch of the leaves, and black point of grain. In California where the disease is usually rare, it was said to be more abundant this year than ever before, occurring particularly in the northern and coastal areas and causing blighting of the leaves.

Collaborators in twelve eastern states and one western mentioned that the disease had not been observed nor reported.

FOOTROT CAUSED BY WOJNOWICIA GRAMINIS (MCALP.) SACC. & SACC.

A footrot associated with this fungus was more prevalent than during previous years in Oregon and was apparently of considerable importance in winter wheat. Many fields showed 25 per cent down grain and the worst fields showed as high as 75 per cent. The trouble may be avoided by planting spring grain, according to Barss. Wojnowicia is associated with the foot rot complex in Kansas.

Recent literature:

Guyot, L. De l'existence de formes pycnidiennes chez Ophiobolus graminis Sacc., et Ophiobolus herpotrichus (Fr.) Sacc. Rev. Path. Vég. & Entom. Agr. 12: 74-81. Jan.-Mar. 1925.

Pycnidia of Wojnowicia graminis have been found frequently on cereals infected by Ophiobolus and also in conjunction with Leptosphaeria. It has also been reported on wheat entirely free from footrot and on other cereals and

grasses. Seedlings of wheat and other cereals are easily infected with the fungus. *Wojnowicia graminis* is considered to be a definite wheat parasite quite distinct from *Ophiobolus graminis*. It attacks young wheat plants, but appears rather as a secondary than as a true parasite.

ROOTROTS (CAUSE UNDETERMINED)

W. D. Valleau in Kentucky reported that foot and root rots of wheat caused minimum losses this year because of nearly ideal weather for wheat development. Pathologists in Minnesota reported less undetermined foot rot than usual, but as much as 10 per cent damage occurred in individual fields and a loss of 0.75 per cent was estimated for the state. In South Dakota, while the foot rot seemed to be less serious than usual, on the whole it did considerable damage, especially in the northern part, and the loss was estimated at one per cent. In Kansas the root rot situation is complicated by the fact that several fungi, including Helminthosporium, Ophiobolus, and Wojnowicia, are associated with the disease. The work in Kansas on tillage as a control measure has been mentioned under the heading "take-all". In Washington a single report of an unidentified foot rot was received from the Spokane Valley.

PINK ROOT CAUSED BY FUSARIUM SP.

This disease is reported only from California by W. W. Mackie who states that it was worse than last year and worse than usual, and caused considerable loss (about 4 per cent). It caused the death of plants at all stages from seedling to maturity, blasting spikelets, and shriveling kernels. It occurred in all parts of the state but was worse in the northern and coastal areas. It attacks oats and barley as well as wheat, and has been known by the California pathologists for as long as ten years.

MOSAIC (CAUSE UNDETERMINED)

From the recent work of McKinney (1) it now appears that the rosette of wheat, originally found near Granite City, Illinois, and known to occur in Indiana and Illinois, is in reality an extreme manifestation of mosaic. On susceptible varieties of winter wheat, such as Harvest Queen, extreme dwarfing of plants and a bluish green coloration of leaves, previously considered as the principal symptom of rosette, occurs, while on other wheats such as Currell the characteristic mosaic mottling takes place. The mottling has also been observed on winter rye.

McKinney (1 & 2) and McKinney, Webb, and Dungan (3) find that the causal agent of this mosaic is capable of persisting in the soil from year

to year. Susceptible varieties of winter wheat never have failed to develop the disease when grown in infested soil out of doors. Artificial inoculation of Harvest Queen wheat with juice from mosaic infected Currell has produced the symptoms characteristic of rosette while inoculation of Currell with the expressed juice from diseased Harvest Queen has produced characteristic leaf mottling.

None of the collaborators reported mosaic or rosette this year. The distribution of the rosette disease as given by McKinney, Webb, and Dungan (3) is shown in the following table..

State	County	Number of infested fields found	Approximate acreage of infested fields
Illinois	Madison	27	670
	Mason	48	1,310
	Sangamon	2	380
	Logan	1	20
Indiana	La Porte	7	213
	Porter	6	120
	Tippecanoe	1	5

Recent literature:

1. McKinney, H. H. A mosaic on winter wheat and winter rye. Phytopath. 15: 495-496. Aug. 1925.

2. ----------- A mosaic of winter wheat and winter rye. U. S. Dept. Agr. Bul. 1361: 1-10. Sept. 1925.

3. ----------- R. W. Webb, and G. H. Dungan. Wheat rosette and its control. Illinois Agr. Exp. Sta. Bul. 264: 275-296. 1925.

OTHER DISEASES

Basal glume rot caused by Bacterium atrofaciens McC. - Pennsylvania and Arkansas are the only states reporting this disease. In Pennsylvania it was less prevalent than last year and was of no economic importance. It was collected June 10 at Media by R. S. Kirby. In Arkansas there appeared to be more and it was noted occurring on various varieties but not causing any serious injury.

Sooty mold caused by Cladosporium herbarum (Pers.) Lk. - Reported to the Plant Disease Survey from Maine for the first time.

Stripe (undet.) - Traces of stripe were reported from Pennsylvania and Illinois. In Pennsylvania it was found only on wheat from New York seed. In Illinois it was mentioned as occurring in much less abundance than last year.

Marasmius tritici was reported during the year by Young growing on decayed stems of wheat, rye, barley, and quack grass. (Young, P. A. A Maras-

mius parasitic on small grains in Illinois. Phytopath. 15: 115-118. 1925)

Freezing injury. - Two states reported on freezing injury as follows:

Ohio: The late frosts of the spring season are thought to have caused more loss to the wheat crop in certain sections of Ohio than occasioned by disease. This is manifested by failure of the heads to fill out, or to only partially fill. In many fields over 25 per cent decrease in yield is found. (Thomas)

Indiana: Very common, causing 75 per cent loss in some cases, however, it averaged only from 2 to 5 per cent for the entire state. It occurred generally throughout the state except in the extreme southern part and the injury occurred to the heads, wholly or partly killing them. Low temperatures of May 25 to 27 were responsible. The wheat was in boot at that time. In some cases the entire head was killed and in other cases only certain spikelets. Where heads were completely killed there was a heavy accumulation of sugar in the stems which turned purple in color. (Gregory)

R Y E

STEM RUST CAUSED BY PUCCINIA GRAMINIS PERS.

Several widely scattered states reported slight amounts of stem rust on rye. In general there was less than, or about the same amount as usual; although in California where rye is usually free from stem rust, it was common but did not do much damage. Collaborators mention early maturity of rye, dry weather, and gradual elimination of barberries as being factors limiting the occurrence of stem rust this year.

Table 82. Estimated losses from stem rust of rye according to collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
1	Connecticut, New York, Michigan, South Dakota	Trace	Pennsylvania, Delaware, Maryland, Virginia, West Virginia, Wisconsin, Minnesota, Missouri, North Dakota, Arkansas, Idaho, California
0.2	Iowa		
0.1	Ohio		

In Michigan, collaborators report that there seems to be considerable of the race of Puccinia graminis that is specialized to rye in the state, and that some of it could be found in all rye fields reasonably close to barberries.

In Virginia, only traces were seen on rye in the section where it was very prevalent on wheat.

Recent literature:

1. Mains, E. B. Rye resistant to leaf rust, stem rust, and powdery mildew. (Abstract) Phytopath. 15: 58-59. Jan. 1925.
Selections from Abruzzes rye showed wide variations in susceptibility to each of these diseases. Some highly resistant races were found. Resistance to each disease is dominant.

LEAF RUST CAUSED BY PUCCINIA DISPERSA ERIKS.

As in the case of leaf rust of wheat, the leaf rust of rye was less prevalent than normal. This probably was because of dry spring weather, although, as pointed out by Mains in his report for Indiana, a severe winter might also have been influential in holding the rust in check. No state reported more leaf rust than last year nor more than the average year. States reporting about the usual amounts were Connecticut, Maryland, Tennessee, South Carolina, Florida, Wisconsin, Minnesota, and Kansas; while those reporting less or much less than normal were Virginia, Georgia, Texas, Arkansas, Ohio, Indiana, Illinois, Michigan, and Colorado.

Collaborators are almost unanimous in reporting that the rust did only slight damage and many of them report no damage whatever. In Illinois, however, it was said to have been the most important rye disease. Losses are given in table 83.

Table 83. Estimated losses from leaf rust of rye, 1925.

Percentage: loss	States reporting	Percentage: loss	States reporting
5	Florida	0.1	Georgia, Ohio
2	South Carolina	Trace	Virginia, Indiana, Wisconsin, Minnesota, Iowa, Nebraska, Kentucky, Arkansas, California
1	Connecticut, New Jersey, Maryland		
0.5	New York, Pennsylvania		
0.4	Illinois		

Mains (1) has made some selections from Abruzzes rye which are resistant to leaf rust as well as stem rust and powdery mildew.

Recent literature:

1. Mains, E. B. Rye resistant to leaf rust, stem rust, and powdery mildew. (Abstract) Phytopath. 15: 58-59. Jan. 1925.

ERGOT CAUSED BY CLAVICEPS PURPUREA (FR.) TUL.

Ergot was another cereal disease that in general was somewhat less prevalent than usual owing to a dry spring. In Minnesota, however, it was more abundant than normal, being present in all rye fields and causing a loss estimated at 0.5 per cent of the crop. In one field 50 per cent of the heads were affected. In North and South Dakota also it was of considerable economic importance. In these three states June precipitation was above normal whereas in most of the other eastern states it was below normal. This fact may explain the greater abundance of ergot in these spring wheat states.

In Michigan collaborators reported difficulty in finding affected heads, and in Kansas ergot was extremely rare in commercial fields.

Table 84. Estimated losses from ergot of rye, 1925.

Percentage: loss	States reporting	Percentage: loss	States reporting
1	North Dakota, South Dakota, Ohio	Trace	New York, New Jersey, Virginia, Michigan, Wisconsin, Iowa, Utah, Idaho
0.5	Minnesota		
0.2	Kentucky		

It was first observed in Wisconsin on June 20 at Madison; in Minnesota, June 14 at St. Paul; and in North Dakota, July 8 at Fargo.

ANTHRACNOSE CAUSED BY COLLETOTRICHUM GRAMINICOLUM (CES.) WILS.

Only five states, New York, Pennsylvania, Tennessee, Ohio, and Wisconsin, reported anthracnose in 1925. In New York it was noted principally in the Hudson River Valley and caused less than one per cent loss. In Pennsylvania, R. S. Kirby reported less than usual, but in spite of that it was the most important rye disease, causing a loss estimated at 3 per cent for the state. In Tennessee anthracnose occurred in about the usual amounts. In Wisconsin it was more prevalent than usual, according to Vaughan, and caused a reduction in yield estimated at 2 per cent.

STEM SMUT CAUSED BY UROCYSTIS OCCULTA (WALLR.) RABH.

States reporting stem smut were New York, Pennsylvania, Virginia, Illinois, Michigan, Wisconsin, Minnesota, North Dakota, and Idaho. In Pennsylvania, where there was more than usual, it was considered to be one of the most destructive rye diseases in the state, causing a loss of 1.5 per cent. Only traces were reported from other states, with the exception of Minnesota which reported 0.5 per cent loss. According to Kirby good control was obtained in Pennsylvania by treating seed with copper carbonate dust at the rate of 3 to 4 ounces per bushel.

LOOSE SMUT CAUSED BY USTILAGO TRITICI (PERS.) ROSTR.

Humphrey and Tapke (1) have recently reported that, as a result of microscopic study and cross inoculation experiments, they have concluded that the loose smut of rye is caused by Ustilago tritici, the organism causing the loose smut of wheat. They inoculated the heads of Stoner, Fultz, and Leap wheat, as well as Rosen and Rimpau rye with spores of loose smut from Rosen rye and from Goens wheat and secured infection in every case. Although loose smut now has been collected on rye in North Dakota, Illinois, Indiana, Kentucky, Minnesota, Missouri, New York, Oklahoma, Tennessee, Virginia, and West Virginia, the reports of occurrence have not included mention of the variety of rye on which the disease was found. The work of Humphrey and Tapke indicates considerable differences in susceptibility. Out of 13 varieties and selections that they have examined in 1922, 1923, and 1924, only two, Rosen and Rimpau, were found with loose smut.

Recent literature:

1. Humphrey, Harry B., and Victor F. Tapke. The loose smut of rye, (Ustilago tritici). Phytopath. 15: 598-605. Oct. 1925.

SCAB CAUSED BY GIBBERELLA SAUBINETII (MONT.) SACC.

Traces of scab were reported from New York, Pennsylvania, Maryland, Tennessee, Wisconsin, North Dakota, and Iowa, but it was of very minor importance in all of these states. Collaborators in nineteen states sent in reports of non-occurrence on rye.

POWDERY MILDEW CAUSED BY ERYSIPHE GRAMINIS DC.

This disease doubtless occurred widely, as usual, but it was observed and reported by collaborators only from the ten states of Massachusetts, Connecticut, New York, Pennsylvania, Maryland, Indiana, Wisconsin, Minnesota, South Dakota, and California. Reports from Massachusetts, Indiana, and Wisconsin mention it as occurring especially in the fall on seedling plants. Losses of 0.2 per cent and 1 per cent were reported from Pennsylvania and Maryland, respectively. E. B. Mains (1) of Indiana indicates that considerable differences in varietal susceptibility have been found, some selections from Abruzzes rye proving highly resistant.

Recent literature:

1. Mains, E. B. Rye resistant to leaf rust, stem rust, and powdery mildew. (Abstract) Phytopath. 15: 58-59. Jan. 1925.

MOSAIC (CAUSE UNDETERMINED)

"In the spring of 1925, it (mosaic) was observed on winter rye growing in infested soil at Granite City, Illinois, and in the same soil which had been transported to Madison, Wisconsin, for experimental study. What appears to be the same mosaic was also found by Dr. A. G. Johnson in winter rye growing as a cover crop in the orchards of the U. S. Department of Agriculture, Arlington Farm, Virginia. Microscopic examinations of mosaiced rye plants from all these sources reveal the presence of cell inclusions which are very similar to, if not identical with, those associated with Wheat mosaic." (McKinney, (2)).

Recent literature:

1. McKinney, H. H. A mosaic disease of winter wheat and winter rye. U. S. Dept. Agr. Bul. 1361: 1-10. Sept. 1925.

2. ----------- A mosaic on winter wheat and winter rye. Phytopath. 15: 495-496. Aug. 1925.

OTHER DISEASES

Helminthosporium sativum Pam., King, & Bak., leafspot, occurred in New York wherever rye was grown, and was reported from Pennsylvania.

Rhynchosporium secalis (Oud.) Davis, scald, was abundant on rye in experimental plots at Corvallis, Oregon, according to Barss. It was worse where barley preceded on the same ground the year before.

Bacterial leafspot, cause undetermined, occurred on the Experiment Station farm at Fort Collins, Colorado. One hundred per cent leaf infection was reported.

Fusarium sp. causing footrot was reported from New York (mostly in Hudson Valley).

Rootrot, due to various fungi. Very little in Minnesota this year. (Sect. Plant. Path.)

Recent literature:

1. Roussakov, L. F. Massenhafter Befall von Winterroggen durch Puccinia coronifera Kleb. im Herbst. 1924. (An epidemic attack of Puccinia coronifera Kleb. on winter rye in the autumn of 1924.) Angew Bot. 7: 262-266. 1925.

During an expedition to the Kamennaya Steppe, Russia in the autumn of 1924, Puccinia coronifera Kleb. (P. lolii) was observed in epidemic form on rye. It is thought that drought conditions reduced the normal resistance of rye to attacks by this rust.

BARLEY

COVERED SMUT CAUSED BY USTILAGO HORDEI (PERS.) KELL. & SW.

Of the twenty-six states reporting on this smut, only three, Maryland, Colorado, and California reported more than normal amounts. The other states reported the same or less. In New York the statement was made that the smut seems to be increasing. In Arkansas it is an important disease of barley, causing as high as 10 per cent loss, but inasmuch as the crop is not grown to any extent, it is not of much economic importance. In Colorado the losses were high, 55 per cent having been observed in one field and the average loss for the state being estimated at 5 per cent. In California also, where the disease was much worse than usual, 7 per cent loss was estimated and a maximum of 60 per cent was observed in one field. W. W. Mackie of California remarks that, because this smut occurs irregularly, neglect of seed treatment caused heavy losses this year.

Table 85. Estimated reduction in yield due to covered smut as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	Arkansas	1.5	New Jersey, Pennsylvania
7	California	1	Maryland, Iowa, North Dakota, Idaho
5	Colorado, Kentucky		
3	Virginia	0.75	Minnesota
2.5	Kansas	0.5	Connecticut, Texas
2	South Dakota, Arizona		

LOOSE SMUT CAUSED BY USTILAGO NUDA (JENS.) KELL. & SW.

The only states reporting more loose smut than usual were Maryland and Illinois. The others reported normal amounts for the most part. As usual the disease was generally distributed all over the country.

It was the most important disease of barley in Pennsylvania, according to collaborators, and the second most important in Illinois, where stripe is the major barley disease. In Michigan also stripe was said to be more abundant than the covered smut.

Dates of earliest appearance:

June 2	Delaware	New Castle Co.	June 8	Illinois	Olmsted
June 4	South Carolina	Clemson College	June 25	Colorado	Eastern portion
June 4	Missouri	Columbia	June 28	Pennsylvania	State College
June 4	Minnesota	University Farm			

Table 86. Estimated reduction in yield due to loose smut of barley as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	Arkansas	1.5	Connecticut, Minnesota, Kansas
4	Pennsylvania	1	Iowa, North Dakota, South Dakota, Arizona
3	Illinois	0.5	Texas, California
2.5	New York, Kentucky		
2	Maryland, Michigan		

At San Antonio, Texas, and Sacaton, Arizona, A. G. Johnson observed that during April, under the extremely dry conditions that existed, the smut invaded the upper leaves.

STEM RUST CAUSED BY PUCCINIA GRAMINIS PERS.

Stem rust of barley appeared to be of about normal prevalence during 1925 but in Minnesota and Idaho more infection was reported than last year. It apparently was of very slight importance, only three states reporting losses greater than 1 per cent. These were Iowa, 2 per cent; and South Dakota and Texas each 1 per cent. In Michigan it was noted that some fields suffered severely when in close proximity to barberry. In Wisconsin and Minnesota barley fields ripened before rust had a chance to do much damage, according to the reports. Dates of earliest observations reported by collaborators were: June 20, Hutchinson, Minn., June 22, Shippensburg, Pa., June 25, Burlington, Colo., and July 11, Freeport, Ill.

LEAF RUST CAUSED BY PUCCINIA ANOMALA ROSTR.

Like the other leaf rusts, Puccinia anomala (P. simplex) occurred in sub-normal amounts, the reason probably being the dry weather occurring during the period of normal infection. Nineteen states reported its occurrence but in none was the loss estimated to be more than one-half of one per cent, being only a trace in practically all cases. Texas, Connecticut, and Ohio estimated 0.5, 0.25, and 0.1 per cent reduction in yield, respectively. In Michigan it was stated that considerable infection occurred but too late to do any damage. Differences in the susceptibility of varieties were noted in California. It was first observed Jan.24 at Harlingen, Texas, June 4 at Clemson College, S. C., and July 28 at Clarion, Pa.

STRIPE CAUSED BY HELMINTHOSPORIUM GRAMINEUM RABH.

In Wisconsin, New York, Nebraska, and California, stripe was more prevalent than usual according to collaborators. In the other states apparently it was of about the same, or of less prevalence than usual. It was widespread, occurring in barley states from New York to California. In Illinois, it was said to be especially abundant in the extreme northern part of the state while in Wisconsin it was especially prevalent in the southern part. It was an important barley disease in Illinois, Michigan, Wisconsin, Iowa, North Dakota, South Dakota, Montana, Utah, and California. In Washington, only a single case was observed and, from Oregon, the report was received that it tended to eliminate itself in that state.

Table 87. Estimated reduction in yield due to barley stripe as reported by collaborators, 1925.

Percentage: loss	States reporting	Percentage: loss	States reporting
5	Iowa	1.5	Michigan
3	Illinois, South Dakota, California	1	Wisconsin, North Dakota
		0.5	Minnesota
2	Utah	0.25	Colorado

As high as 75 per cent infection was observed in one field in Michigan. Other maximum percentages noted were, Illinois 12.9, Wisconsin 10, and Minnesota 10.

Dates of earliest appearance:

May 8	South Carolina	Clemson College	June 10	Illinois	Paris
May 25	Minnesota	University Farm	June 28	Pennsylvania	State College
June 2	Delaware	New Castle Co.	July 2	North Dakota	Fargo

A. G. Johnson reported that due to the extremely dry conditions prevailing in Texas and Arizona, barley plants affected with stripe remained chiefly in the rosette stage.

The varieties Minsturdi and Odessa were reported as very susceptible in Minnesota.

A number of workers have reported on the control of barley stripe by means of various seed treatments, during the year. (See references 1-4)

Recent literature:

1. Gram, E., and Sofie Rostrup. Oversigt over Sygdomme hos Landbrugets og Havebrugets Kulturplanter i 1924. (Survey of the diseases of agricultural and horticultural cultivated plants in 1924.) Tidsskr. for Planteavl. 31: 353-417. 1925.

   Appears to be on the increase, especially on Gold, Prentice, and Karl varieties. Good control with germisan or tillantin C. Dusting with germisan or $CuCo_3$ also proved satisfactory.

2. Johnson, T. Studies on the pathogenicity and physiology of Helminthosporium gramineum Rabh. Phytopath. 15: 797-804. Dec. 1925.

Low soil temperatures favor infection, the greatest infection occurring at 10° to 12° C. Very little infection took place at soil temperatures of 20° C. Infection by means of inoculation was secured. By removing the hulls infection was increased. Evidence was obtained indicating physiologic specialization of _H. gramineum_.

3. Neuweiler, E. Bericht über die Tätigkeit der Schweizerischen Landwirtschaftlichen Versuchsanstalt Oerlikon in den Jahren 1920-1923. IV. Pflanzenschutz. (Report on the work of the Swiss Agricultural Experiment Station Oerlikon during the years 1920-1923. IV. Plant protection.) Landw. Jahrb. der Schweiz. 39: 252-260. 1925.

Satisfactory control with germisan, tillantin, segetan, kalimat, and fungolit.

4. Russell, H. L., F. B. Morrison, and W. H. Ebling. Plant disease investigations of the Wisconsin Station. _In_ Wisconsin Agr. Exp. Sta. Bul. 373: 5-16. 1925.

Cresol-mercury and phenol-mercury compounds more effective in control of stripe than formaldehyde or copper sulphate.

5. Van Poeteren, N. Verslag over de werkzaamheden van den Plantenziektenkundigen Dienst in het jaar 1924. (Report of the activities of the Phytopathological Service in the year 1924.) Versl. en Meded. Plantenziektenkundigen Dienst te Wageningen 41: 62 pp. 1925.

Germisan gave better control than copper sulphate or uspulun reducing the incidence from 763 (in control) to 1, when applied at the rate of 100 gm. germisan to 3 liters water per hectol. of seed, and to 4 and 6 respectively when 75 or 50 gms. were used.

6. Vogt, E. Ein beitrag zur kenntnis von Helminthosporium gramineum Rbh. (A contribution to the knowledge of Helminthosporium gramineum Rbh.) Arb. Biol. Reichsanst. Land. u. Forstw. 11: 387-397. 1923.

SPOT BLOTCH CAUSED BY HELMINTHOSPORIUM SATIVUM PAM., KING, & BAK.

New York, Pennsylvania, Virginia, West Virginia, Minnesota, Iowa, North Dakota, Kansas, Colorado, and California reported spot blotch in 1925. All of those reporting on relative prevalence mentioned it as being about as usual. Negative reports were received from fourteen widely scattered states. The disease was of very minor importance in all states; only traces of loss being reported with the exception of Pennsylvania and Minnesota from which 1 per cent and 0.75 per cent loss was reported respectively.

Recent literature:

1. Christensen, J. J. Physiologic specialization and mutation in Helminthosporium sativum. Phytopath. 15: 785-795. Dec. 1925.

2. Griffee, F. Correlated inheritance of botanical characters in barley, and manner of reaction to Helminthosporium sativum. Jour. Agr. Res. 30: 915-935. 1925.

NET BLOTCH CAUSED BY PYRENOPHORA TERES (DIED.) DRECHS.

Net blotch occurred in normal amounts, according to collaborators reporting. Thirteen widely scattered states from New York and Virginia westward to Arizona and California reported it. In general it was of minor importance, only traces of loss being reported in all cases except Iowa.

Dates of earliest observation reported were: May 15, Madison, Wis., June 22, Shippensburg, Pa., July 2, University Farm, Minn., and July 10, Wichert, Ill.

W. W. Mackie of California reported that difference in varietal resistance was very marked.

SCALD CAUSED BY RHYNCHOSPORIUM SECALIS (OUD.) DAVIS

Scald of barley appears to have been of importance only in the Pacific Coast region. Reports of non-observance were made from eighteen states, but traces of scald were reported from Wisconsin, Iowa, Kansas, and Idaho, while in western Oregon it was said to be common on barley and the cause of some loss. In California, according to W. W. Mackie, it was much worse than usual and of very great importance, killing the leaves, shriveling the kernels, and weakening the plants to such an extent that a reduction in yield of probably 25 per cent occurred. It did more damage than it has for years in California, especially in the Sacramento and San Joaquin Valleys.

SCAB CAUSED BY GIBBERELLA SAUBINETII (MONT.) SACC.

Traces of scab were reported from New York, Pennsylvania, Maryland, Wisconsin, Iowa, and North Dakota. Eighteen other states reported that the disease had not been seen. In Minnesota, no scab was observed on the heads but root rot attributed to the scab organism was noted. In none of the states reporting scab did it do much damage to barley.

ERGOT CAUSED BY CLAVICEPS PURPUREA (FR.) TUL.

The only states reporting ergot were Indiana, Minnesota, South Dakota, Iowa, and Nebraska. Only an occasional infected plant was found in these states. The disease may, therefore, be said to have been of no economic importance on barley.

ANTHRACNOSE CAUSED BY COLLETOTRICHUM GRAMINICOLUM (CES.) WILS.

Traces of anthracnose were observed in Pennsylvania, Wisconsin, and Iowa. Nineteen other widely scattered states reported that the disease had never been found or was not observed in 1925. Only traces of loss were mentioned in the states reporting it.

OTHER DISEASES

Pink root caused by Fusarium sp. was said to be worse than usual in California, causing considerable damage. As much as 2 per cent loss was estimated. It took the form of a seedling blight and death or injury to mature plants, and occurred throughout the barley growing sections of the state.

Stripe rust caused by Puccinia glumarum (Schw.) Eriks. & Henn. was noted on barley in the rust nursery at Moscow, Idaho.

Powdery mildew caused by Erysiphe graminis DC. Reported from New York and Pennsylvania as of very slight importance.

Bacterial blight caused by Bacterium translucens Jones, Johnson, & Reddy was mentioned as occurring in Texas, Michigan, and Colorado. In one field in Jackson County, Michigan, from 50 to 75 per cent of the plants were affected. A bacterial blight which was probably the same disease was noted at Corvallis, Oregon, May 9.

Literature on other diseases:

1. Tasugi, H. and W. Yamanda. Stinking smut of the barley and the naked barley of Japan. (Preliminary report). Ann. Phytopath. Soc. Japan 1: 31-41. 1925. (English Summary)
First found on barley in Japan in 1913 since which time it has spread. It occurs in northern and cooler parts of Japan. Has been confused with Tilletia tritici and T. laevis as well as Ustilago hordei, all of which it resembles as far as symptoms are concerned. It corresponds with Tilletia pancicii Bub. & Ran.

2. Van Poeteren, N. Verslag over de werkzaamheden van den Plantenziektenkundigen Dienst in het jaar 1924. (Report of the activities of the Phytopathological Service in the year 1924.) Versl. en Meded. Plantenziektenkundigen Dienst te Wageningen 41: 62 pp. 1925.

Among other diseases a barley leafspot, gray with a darker brown margin and caused by Marssonina secalis is reported.

OATS

LOOSE AND COVERED SMUTS OF OATS CAUSED BY USTILAGO AVENAE (PERS.) JENS., AND U. LEVIS (KELL. & SW.) MAGN.

In spite of the ease with which the oat smuts are controlled, the losses occasioned by them continue heavy. Seed treatment and to some extent the use of resistant varieties are reducing losses but these measures are practiced by only a portion of the farmers, and not every year by them, so that the average loss over the country as a whole seems to remain about the same year by year. An indication of the losses that might occur if control measures were not employed at all is given in the following percentages of smut observed in individual fields in several of the states last year. In Minnesota a field containing 80 per cent smutted heads was observed while collaborators in other states reported maximum percentages as follows: Georgia 40, Colorado 35, Pennsylvania 31, Arkansas 20, Ohio 20, Florida 15, Kansas 15, North Dakota 10, Arizona 10, and Wisconsin 10. The following average percentage reduction in yield on account of smuts in 1925 was reported by collaborators.

Table 88. Percentage losses from oat smuts as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	Arkansas	2	Maine, Connecticut, New Jersey, Michigan, North Dakota, Arizona, Idaho, Oregon
6	Pennsylvania, Kentucky		
5	Georgia, Minnesota, Utah		
4	New York, Virginia, Ohio		
3.4	Illinois	1.5	South Carolina, Colorado
3	Florida	1	West Virginia, Texas
2.5	North Carolina, Wisconsin	0.5	Kansas, Louisiana, California

Collaborators in 39 states reported on oat smut. Some of them mentioned the disease as more prevalent than usual, others the same, and still others, less. In Texas, Oklahoma, and Arkansas it was particularly mentioned that winter oats were not nearly so badly smutted as spring oats on which infection was heavy. It is not unlikely that temperature at the time of germination was a very influential factor in these states. The month of February, when the spring oats are planted in that area, was unusually warm, being 7.1° above normal.

In Michigan, a decrease in the amount of smut was mentioned with the statement that the very dry season following planting was perhaps responsible. A paper on the relation of temperature and humidity to smut infection has been published during the year by Tråen (16). He found that incidence of infection with Ustilago levis was greater at 15° and 20°C. than at 9°C. and that with favorable temperatures the heaviest infection occurred in moderately damp, rather than in wet, soil.

Considerable work has been reported during the past year on smut resistance of oat varieties. Reed and Stanton (11) studied the susceptibility of 92 F3 families of a cross between Fulghum and Swedish Select and noted a wide range of susceptibility. Twenty-five families showed resistance comparable to the resistant Fulghum parent. The F4 selections from resistant F3 families were in general very resistant. The selections appeared to behave in a similar fashion toward both loose and covered smuts. Reed, Griffiths, and Briggs (10) reported great variation of susceptibility within the species Avena sativa of which 90 varieties and 182 strains were tested A few - Black Mesdag, Culberson, Caucasus, Danish Island, and Siberian proved very resistant to both smuts. A larger number proved highly susceptible but by far the greatest number were intermediate between the two extremes. Gaines (6) tested 210 varieties and selections for resistance to covered smut. Twenty-one of these remained smut-free over an 8 year period. Markton is one of the best of the immune selections. It has been increased and grown commercially since 1924.

In connection with their annual reports, collaborators were asked to give information on the kind of seed treatment that is being recommended in their states and to estimate the amount of formaldehyde used for treating oats. Replies were received from 24 states. In 23 of these, the formaldehyde treatment is used, while in one, California, copper carbonate also seems to be recommended. In the majority of the states, the standard formaldehyde spray method (one pint to 40 gallons of water) is recommended, but in Connecticut, New York, Pennsylvania, Georgia, Ohio, North Dakota, and Kansas, and probably other states the dry method (one pint formaldehyde to 1 pint of water sprayed on 50 bushels of oats) is also recommended and used rather extensively. In Indiana they are using one pint of formaldehyde to 5 gallons of water applied to 40 to 50 bushels of seed, while in Idaho the extensive and successful use of the Idaho modification of the concentrated spray treatment (one pint formaldehyde to 10 pints water, sprayed on 50 bushels of seed) is reported. Comparatively few collaborators ventured to estimate the amount of formaldehyde used in their states for treatment of oats; however, in New York, Illinois, and Iowa, it was estimated that 30, 10, and 3 per cent, respectively, of the seed that was sown was treated.

During the year, several papers have come out giving results of various seed treatment tests. Carne (1) states that the formaldehyde or blue stone treatments are more effective than copper carbonate dust. Dickson (3) using several compounds, chiefly dusts, found that the nickel dusts gave best results. Thomas (13, 14, 15) reported that of the copper and nickel dusts tried, none gave adequate control when used alone, but when combined with mercuric chloride some were quite effective and did not impair seed germination.

Recent literature:

1. Carne, W. M. Seed treatment for oat smut. Jour. Dept. Agr. Western Australia II, 2: 65. March 1925.

2. Coulson, J. G., and E. A. Lods. Oat smut infection in relation to size of grain. (Abstract) Phytopath. 15: 302-303. May 1925.

3. Dickson, B. T. Oat smut control tests at Macdonald College during 1924. (Abstract) Phytopath. 15: 301. May 1925.

4. ----------- Oat smut control experiments in 1923. Ann. Rept. Quebec Soc. Protection Plants 16 (1923/24): 77-79. 1925.

5. Gaines, E. F. The inheritance of disease resistance in wheat and oats. Phytopath. 15: 341-349. 1925.

6. ----------- Resistance to covered smut in varieties and hybrids of oats. Jour. Amer. Soc. Agron. 17: 775-789. Dec. 1925.

7. Gordon, W. L. Studies concerning injury to seed oats after smut disinfection. Ann. Rept. Quebec Soc. Protection Plants 16 (1923/24): 79-94. 1925.

8. Howe, Mary F. Changes in hydrogen-ion concentration induced by carbon dioxide in relation to the germination of spores of Ustilago levis. (Abstract) Phytopath. 16: 69-70 Jan. 1926.

9. Reed, Geo. M. The inheritance of resistance of oat hybrids to loose smut. Mycologia 17: 163-181. 1925.

10. ----------- Marion A. Griffiths, and Fred N. Briggs. Varietal susceptibility of oats to loose and covered smuts. U. S. Dept. Agr. Bul. 1275: 1-39. April 1925.

11. ----------- and T. R. Stanton. Relative susceptibility of selections from a Fulghum-Swedish Select cross to the smuts of oats. Jour. Agr. Res. 30: 375-391. Feb. 1925.

12. Sampson, Kathleen. Some infection experiments with loose and covered smuts of oats which indicate the existence in them of biological species. Ann. Appl. Biol. 12: 314-325. July 1925.

13. Thomas, R. C. Effective dust treatments for the control of smut of oats. Science n. s. 61: 47-48. 1925.

14. ----------- Control of smuts of wheat and oats with special reference to dust treatments. Ohio Agr. Exp. Sta. Bul. 390: 405-423. Dec. 1925.

15. Thomas, R. C., and Paul E. Tilford. Dust treatments for the control of oat smut. Ohio Agr. Exp. Sta. Bimonthly Bul. 11 (1): 18-23. Jan.-Feb. 1926.

16. Tråen, A. E. Ueber den Einfluss der Temperatur und der Feuchtigkeit auf den Brandebefall des Hafers durch gedeckten Haferbrand (Ustilago laevis (K. & S.) Mag.). (On the influence of temperature and humidity on the incidence of covered smut of oats (Ustilago laevis (K. & S.) Mag.).) Meld. Norges Landbrukshøiskole 2-3: 157-168. 1925. (Norwegian summary)

STEM RUST CAUSED BY PUCCINIA GRAMINIS PERS.

On oats, stem rust occurred in many widely scattered states but it was only severe in the form of small, local outbreaks in the vicinity of barberries and especially on late oats. A number of collaborators mentioned the fact that the late sown oats were most severely attacked. The disease was reported from Louisiana for the first time. In Pennsylvania it occurred chiefly in the northeastern part of the state where barberries are common. In North Dakota it was mentioned as being especially prevalent in the Red River Valley, and in Washington it was serious only in the Skagit Valley of the western part of the state.

For the most part much less than normal loss occurred. Exceptions to this are in the cases of Idaho and California where more than normal amounts were reported. In California, it was of much importance on the oat crop, ruining much of the oat hay and reducing the yield of grain, according to W. W. Mackie. Dry weather during the spring and summer months over the greater part of the country accounts for the reduced amount of infection. In the western states, however, including California, the season was wet, all months from April to September having precipitation above normal, which probably explains the abundance of the disease in California. The greatest losses outside of California were in Pennsylvania, Wisconsin, and the Dakotas. The estimated losses were California 2 per cent, Pennsylvania 1.5 per cent, Connecticut, Wisconsin, North Dakota, and South Dakota 1 per cent, Michigan and Iowa 0.5 per cent, and in nineteen other states reporting, a trace.

Dates of earliest observation:

Jan. 1	Texas	Grand View	July 10	Illinois	Rockford
May 1	Arizona	Maricopa Co.	July 23	Pennsylvania	Montrose
June 20	Minnesota	Hutchinson	Aug. 1	Connecticut	Westport

Concerning resistant varieties, R. S. Kirby of Pennsylvania reported that Richland, White Russian, and Heigira Rustproof were resistant while Burt, Silvermine, Victory, Cornellian, and Patterson were susceptible. Mackie mentioned that, in California, the only satisfactory variety found resistant is Richland 320A which is immune under California conditions. The U. S. Department of Agriculture has been testing varieties of oats for resistance for several years. In the spring of 1925, sixteen of these varieties were distributed to 51 cooperators for testing under different environmental

conditions. Among these promising selections were Minnesota No. 686, Minnesota No. 687, Victory, Minota X White Tartar, Richland, White Tartar, Heigira Rust-proof.

Recent literature:

1. Dietz, S. M. The inheritance of resistance to Puccinia graminis avenae. (Abstract) Phytopath. 15: 54. 1925.

CROWN RUST CAUSED BY PUCCINIA CORONATA ODA.

Crown rust was generally much less prevalent than usual over the country as a whole. The only states reporting more than last year were Illinois, Wisconsin, North Dakota, and California. The dry spring and early summer undoubtedly accounts for the reduced infection in most areas. Regarding the weather factor, an observation by S. M. Dietz of Iowa is of interest. He found infection of Rhamnus lanceolata in southwestern Iowa to be nearly 100 per cent during April and May. It was almost impossible to find a leaf without several aecia and many of the bushes were so heavily infected that they appeared yellowish from a distance. However, when this area was revisited on May 26 most of the aecial material had dried up and although over three hundred oat fields and many wild grasses were inspected, no urediniospores were found prior to June 6, when a single uredinial sorus was found on oats in Warren County. Dietz says that the failure of oats and grasses to become infected was probably due to the extremely dry weather.

The percentage losses were highest in the southern states as usual, Florida, Louisiana, and California leading.

Table 89. Estimated reduction in yield due to crown rust as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
26	Florida	0.5	Pennsylvania, Texas
3	Louisiana, California	0.1	Georgia, Ohio
1	Connecticut, Wisconsin		

The results of a survey in Iowa and parts of Missouri and Minnesota by S. M. Dietz, mentioned above, have been reported (Plant Disease Reporter 9: 30-31, July 15, 1925). In the great majority of plantings of Rhamnus cathartica and R. lanceolata rust infection was found, and, if the weather conditions had been favorable heavy infection of oats undoubtedly would have occurred.

Dates of earliest appearance as reported were: January, Gainesville, Fla.; January 24, Harlingen, Texas; April 20, Baton Rouge, La.; April 23, Story County, Iowa (on Rhamnus); May 8, Nebraska (on Rhamnus); May 20, Wayne County, N. Y.; May 25, Amherst, Mass. (on Rhamnus); June 2, Brown County, Ill.; June 12, State College, Pa. (on Rhamnus); June 22, Clemson College, S. C., and Steele County, Minn.

Recent literature:

1. Dietz, S. M. Alternate hosts of Puccinia coronata Corda. (Abstract) Phytopath. 15: 54. Jan. 1925.

2. ----------- Alternate hosts of Puccinia coronata II. (Abstract) Phytopath. 16: 84. Jan. 1926.

3. ----------- The effect of the alternate hosts on physiologic forms. (Abstract) Phytopath. 16: 83. Jan. 1926.

BLAST (NON-PAR.)

More than the usual amounts of blast were noted in Tennessee, Arkansas, Illinois, and California and in addition, more than last year was reported from Iowa. Collaborators in other states mentioned it as being about as usual. Dry weather, which kept down many of the fungous diseases, might be expected to have the opposite effect on a disease such as blast, for under dry soil conditions it is natural to suppose that more of the disease might result. In Arkansas it was mentioned as being very important on winter oats, causing a reduction in yield of perhaps 7 per cent on the average, while spring oats were almost free. In Illinois, it was second to smut in importance, being especially severe in the central counties and causing an estimated loss for the state of about 1.7 per cent. Other losses reported were: 10 per cent, Montana; 7 per cent, Iowa; 5 per cent, Minnesota and Kansas; 1 per cent, Pennsylvania. Differences in varietal susceptibility were noted in Idaho.

HALO LEAF BLIGHT CAUSED BY BACTERIUM CORONAFACIENS ELLIOTT

Halo blight was reported as worse than usual in Illinois and Iowa. In each of these states the reduction in yield was estimated at 1 per cent. In Illinois it was said to be the most prevalent, conspicuous, and serious of the foliage diseases. California also reports more than ordinarily. All of the other states reporting mention it as being of the same prevalence as or less than usual. In general, it was of minor importance, only traces of loss being recorded except in the two states mentioned. Dates of earliest observation were: April 25, Harrodsburg, Ky.; May (early) Fayetteville, Ark.; May 2, Madison, Wis.; May 20, Silver Lake, Minn.; June 3, Scott County, Ill.; June 10, Houston, Del.; and June 22, Shippensburg, Pa.

SCAB CAUSED BY GIBBERELLA SAUBINETII (MONT.) SACC.

Scab was of no economic importance on oats in 1925. It was only observed in and reported to the Survey from six states, namely; Pennsylvania,

Maryland, Tennessee, Wisconsin, Minnesota, and Iowa, and in these only traces were noted. The dates of earliest observation reported were July 4, Madison, Wis.; July 9, Steele County, Minnesota, and July 23, Montrose, Pa.

ANTHRACNOSE CAUSED BY COLLETOTRICHUM GRAMINICOLUM (CES.) WILS.

Only traces of anthracnose were observed in and reported to the Survey from four states, New York, Pennsylvania, Ohio, and Wisconsin. Twenty-one other states reported that it had not been observed or that no data were available concerning it.

OTHER DISEASES

Bacterial leaf blotch caused by Pseudomonas sp. This bacterial disease, which seems to be different from halo blight, was reported from Arkansas by H. R. Rosen as follows:

> "Very common on certain varieties, particularly on Fulghum and Swedish Select, but not doing any serious damage. Differs from halo blight in that the yellowish or brownish, irregular spots are not surrounded by halos. Artificial infections with the organism isolated from these spots also show no halos, while the halo blight organism, isolated by the writer, shows the typical halos on the same variety of oats. Will be glad to get material from other collaborators."

Bacterial stripe, cause undetermined. "Two or three blades found by A. G. Johnson on College Farm, showing stripes and bacterial exudate, May 9." (Barss, Oregon)

Powdery mildew caused by Erysiphe graminis DC. New York (trace).

Pink root caused by Fusarium sp. was common everywhere in California, according to Mackie, reducing the yield to a considerable extent. It causes death of seedlings and blasting of grain.

Leafspot caused by Helminthosporium sp., probably H. avenae Eidam was reported from New York (trace), and Pennsylvania (trace).

Speckled blotch caused by Leptosphaeria avenaria Weber. One specimen collected by W. H. Davis of Massachusetts, May 5.

Southern blight caused by Sclerotium rolfsii Sacc. This disease, which commonly does not attack the cereal crops, was reported from Mississippi by J. M. Wallace, who stated that it occurred in the cereal nursery at the Agricultural College where several plants were killed by the fungus.

Recent literature:

1. Clausen. Haferkrankheiten nichtparasitarer Natur. (Oat diseases of a non-parasitic nature.) Illus. Landw. Zeit. 45: 143. 1925.
Gray speck, yellow tip, soil acidity disease, and a

yellowish-brown discoloration caused by lack of potash are discussed.

2. Rives, L. Sur une maladie ocasionnelle de l'avoine. Jour. Agr. Prat. 89 (n. s., 44): 148. Aug. 22, 1925.
   Asterocystis radicis.

C O R N

SMUT CAUSED BY USTILAGO ZEAE (BECKM.) UNG.

Probably more states reported on corn smut in 1925 than on any other cereal disease, in fact, practically all states sending in any plant disease reports mentioned the occurrence of corn smut. This illustrates further the fact that the disease occurs in all corn regions. Collaborators in some states mentioned that it was more common in some sections than in others. For instance, in Georgia it was mentioned as being most common in the southern counties. In Florida it was worse in the northern half, in Kansas it was more prevalent in the central and western parts, and in Colorado it seemed to be common in the eastern part of the state. The exact weather conditions influencing smut are somewhat uncertain. In general, the summer of 1925 was very dry, at least east of the Rocky Mountains, but in spite of that fact certain eastern states reported more smut than the average. Along the coast from New Jersey, through Delaware, Maryland and Virginia there were complaints of an unusual abundance of smut in corn, and in Indiana, Wisconsin, and Minnesota collaborators reported more than usual and more than last year; also in Colorado more was noted although the aggregate loss was slight, and in California where rainfall was above normal throughout the season, it was rated as of more importance than ordinarily.

Table 90. Estimated reduction in yield of corn because of smut as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
5	Kansas	1	New Jersey, Virginia, West Virginia, Florida, Michigan, South Dakota Tennessee, Utah, Maryland
4	Iowa, North Dakota, Arizona		
3	Connecticut, Ohio		
2	New York, Pennsylvania, North Carolina, Minnesota	0.5	Delaware, Kentucky

Collaborators in two states mentioned the type of injury that was most common. In Wisconsin it was mostly on the ear and tassel, according to Vaughan; in Iowa, joints, tassel and ears were mentioned as being affected. Other observations of interest were reported. In Maine, according to Folsom, the disease is usually rare, but this season several specimens were received indicating increased prevalence. In South Carolina as high as 25 per cent infection was estimated by one grower in his field and in Oklahoma as high as 40 per cent infection was noted on old corn land. In Michigan sweet corn seemed to show less of the disease than usual and in early planted field corn there was also less. In Wisconsin more smut was noted on sweet than on field corn. In Nebraska, collaborators reported smut as very common and becoming worse.

Considerable work has been reported recently indicating success in breeding and selection for resistance of corn to smut. However, this problem is a complicated one for, as is pointed out by Stakman and Christensen (5), there are probably several physiological forms of smut which will react differently; and also as mentioned by Fleischmann, hard, early maturing corns are less susceptible than soft, late ones and environmental factors which influence hardness and earliness will influence also the amount of smut infection. He points out that fertilizers are important in this connection and states that although the tendency to smut is apparently hereditary in character, the factors involved are very complex.

Recent literature:

1. Fleischmann, R. Ist Neigung zu Maisbrand erblich und Immunitätszüchtung hierbei aussichtsreich? Deut. Landw. Presse. 52: 13-14. Jan. 10, 1925.

2. Garber, R. J., and K. S. Quisenberry. Breeding corn for resistance to smut. Jour. Amer. Soc. Agron. 17: 132-140. 1925.

3. Immer, F. R., and J. J. Christensen. The reaction of selfed lines and crosses of maize to Ustilago zeae. Phytopath. 15: 699-707. Nov. 1925.

4. Potter, Alden A., and Leo E. Melchers. Study of the life history and ecologic relations of the smut of maize. Jour. Agr. Res. 30: 161-173. 1925.

5. Stakman, E. C., and J. J. Christensen. Physiologic specialization of Ustilago zeae and Puccinia sorghi and their relation to corn improvement. (Abstract) Phytopath. 16: 84. Jan. 1926.

LEAF RUST CAUSED BY PUCCINIA SORGHI SCHW.

More leaf rust than usual was reported in 1925 from North Carolina, Arkansas, Michigan, and Minnesota. Other states reporting mentioned that it was of the same prevalence, or less than usual. It occurred generally east of the Great Plains, but no states west of Colorado reported it.

Losses as reported by collaborators were: 2 per cent, North Carolina and Iowa, 0.1 per cent, Georgia, and traces from a large number of other states. It will be noted, therefore, that as a corn disease rust was of decidedly minor importance.

In Michigan it was mentioned as being severe on late plantings, especially of sweet corn. The average loss for the state, however, was only a trace.

Dates of earliest appearance as reported by collaborators were: June 14, Decatur County, Iowa; July 10, Georgia; July 24, Pike County, Illinois; July 27, University Farm, St. Paul, Minnesota; September 21, Linden, Pennsylvania.

An interesting observation is that of G. W. Fant of North Carolina who reports as follows:

> "Some of the cereal diseases were a little more prevalent than usual. Among these was corn rust produced by Puccinia sorghi which was quite common during the past summer. This disease was of greatest prevalence in eastern North Carolina, particularly where soybeans grown with corn tended to increase the humidity near the ground by shading."

In Iowa, M. A. Smith (1) found the alternate host of this rust, Oxalis corniculata, heavily infected. The earliest infection he observed was on April 28 and the latest on June 19. He has also conducted and reported on trials with the germination of spores of different ages and subjected to various humidities.

Recent literature:

1. Smith, M. A. Infection and spore germination studies with Puccinia sorghi. (Abstract) Phytopath. 16: 69. Jan. 1926.

DIPLODIA EAR ROT

Owing to the dry season Diplodia was less conspicuous throughout the corn belt than usual. Of the twenty-three states that reported it none mentioned it as being more prevalent than normal and only five mentioned it as being of even average prevalence. The remainder reported less. The latter part of the season during September and October was wet in some states, resulting in some late infection. Estimates of losses were: 3 per cent, Virginia, Georgia and Indiana; 2 per cent, Maryland, North Carolina and Iowa; 1 per cent, Delaware, South Dakota and California; 0.5 per cent, Illinois; and 0.3 per cent, Pennsylvania.

Koehler of Illinois reports percentages of Diplodia-infected ears as compared with those infected with Fusarium and Gibberella, as determined by counts of 660 bushels harvested from the experimental plots at Urbana. The percentages and his statement are as follows:

> "Attacked by Diplodia zeae 8.53 per cent; attacked by Fusarium moniliforme 2.68 per cent; and attacked by Gibberella saubinetii 0.07 per cent. When more than one

fungus occurred on an ear it was classed according to the one that seemed to be doing the most damage. An ear was classed as infected when 6 or more kernels showed evidence of rot. This, of course, only includes the direct rots and not the seed infections which only become visible on the germinator. Infection with G. saubinetii is slight this year while last year it was nearly equal with the amount of Diplodia infection."

Another note of interest is that of Manns and Adams (6) of Delaware who found that old corn from the 1922 crop kept stored in the laboratory and tested after it was two or three years old showed a reduction in amount of Diplodia and Gibberella.

A noteworthy contribution to the practical solution of the ear rot and root rot problem is that on seed treatments of sweet and field corn as reported by Holbert, Reddy, and Koehler (4) and by Reddy, Holbert, and Erwin (5) who, using various organic mercury compounds, have succeeded in greatly increasing the yield from seed infected with Diplodia and other organisms.

Recent literature:

1. Durrell, L. W. A preliminary study of fungous action as the cause of down corn. Phytopath. 15: 146-154. March 1925.

2. Edgerton, C. W., and A. F. Kidder. Fungous infection of seed corn kernels and the importance of germination tests. Louisiana Agr. Exp. Sta. Bul. 193: 1-24. 1925.

3. Holbert, J. W., W. L. Burlison, B. Koehler, C. M. Woodworth, and G. H. Dungan. Corn root, stalk, and ear rot diseases, and their control thru seed selection and breeding. Illinois Agr. Exp. Sta. Bul. 255 (abridged): 1-99. 1925.

4. ---------- Chas. S. Reddy, and Benjamin Koehler. Seed treatments for the control of certain diseases of dent corn. (Abstract) Phytopath. 16: 82-83. Jan. 1926.

5. Reddy, C. S., J. R. Holbert, and A. T. Erwin. Sweet corn seed treatment in 1925. (Abstract) Phytopath. 16: 65. Jan. 1926.

6. Manns, T. F., and J. F. Adams. (Report of) Department of plant pathology and soil bacteriology. Delaware Agr. Exp. Sta. Bul. 139: 24-29. 1925.

ROOT AND STALK ROTS CAUSED BY GIBBERELLA SPP. AND FUSARIUM SPP.

These diseases were reported about as usual. More than the average however, was reported from Michigan and California, while less than the average was reported from New York, West Virginia, Kentucky and Ohio. The following are some of the reports received from collaborators:

Maryland: Some resistance to the disease has been developed during the past five years through selection of ears free from internal cob-discoloration. (Jehle & Temple)

Virginia: Death of corn in well defined areas, evidently due to soil conditions, was more prevalent than usual. (Fromme & Godkin)

Kentucky: Because of excellent growing conditions up to tasseling time, root injury was less conspicuous than usual. (Valleau)

Georgia: Less serious in southern Georgia than in 1924. Most common in fields showing lack of sufficient fertilizer. One field in Lowndes County, July 23, showed 90 per cent of plants "down" after a wind storm due to small root system severely rotted. (Boyd)

In some fields that would normally produce 50 to 60 bushels to the acre the yield was cut down to 10. It is impossible to tell how much was due to dry weather or if the limiting factor was the Fusarium. (Miller)

Ohio: Much less in evidence in Ohio this year than normal. Particularly in fields where attention has been given to maintenance of fertility and the selection of seed corn, root rot is hard to find. (Thomas)

Illinois: Field examinations, incompletely compiled, indicate an apparent infection of 14 to 18 per cent with an apparent loss of 5 to 6 per cent. (Tehon)

Michigan: Fusarium root rots were generally reported this season in excess of average. High temperatures of June, July, and August favorable for development. Well fertilized fields from selected seed not damaged. (Nelson)

Kansas: Gibberella sp. absent in state. Fusarium spp. (especially moniliforme) most common. Diplodia, Basisporium, Rhizopus, and Penicillium are other organisms found. Soil acidity problems and metal injury are factors. The problem is complex and no single factor can be said to be responsible. (Melchers)

Percentage losses as estimated by collaborators were as follows: 10-Kansas; 5 to 10 - South Dakota; 5 - Indiana, Tennessee; 4 - Virginia; 3 - Pennsylvania, North Carolina, Wisconsin; 2 - West Virginia, Georgia; 1.5 - Delaware; 1 - Michigan and Minnesota.

The work in Delaware, which showed a reduction in Gibberella infection in old seed from the 1922 crop, has been mentioned under the heading of Diplodia. In Wisconsin (8) seed corn gathered before frost and artificially dried to a moisture content of 12 per cent was said to give a perfect stand free from root rot, as compared with a 40 per cent stand from uncured crib corn.

Recent literature:

1. Clinton, G. P. Report of the Department of Botany, Connecticut Agr. Exp. Sta. Bul. 264: 207-210. 1925.

2. Cooper, Thomas. Corn root-rot studies. Kentucky Agr. Exp. Sta. Ann. Rept. 37 (1924): 32-33. 1925.

3. Durrell, L. W. A preliminary study of fungous action as the cause of down corn. Phytopath. 15: 146-154. 1925.

4. Edgerton, C. W. and A. F. Kidder. Fungous infection of seed corn kernels and the importance of germination tests. Louisiana Agr. Exp. Sta. Bul. 193: 1-24. 1925.

5. Hoffer, G. N., and J. F. Trost. Influence of balanced nutrient supply on susceptibility of corn plants to Gibberella saubinetii (Mont.) Sacc. (Abstract) Phytopath. 15: 59-60. Jan. 1925.

6. Holbert, J. R., W. L. Burlison, B. Koehler, C. M. Woodworth, and G. H. Dungan. Corn root, stalk, and ear rot diseases, and their control thru seed selection and breeding. Illinois Agr. Exp. Sta. Bul. 255 (abridged): 1-99. 1925.

7. Koehler, B., G. H. Dungan, and J. R. Holbert. Factors influencing lodging in corn. Illinois Agr. Exp. Sta. Bul. 266: 311-371. 1925.

8. Russell, H. L., F. B. Morrison, and W. H. Ebling. Corn root rot. In New pages in farm progress. Wisconsin Agr. Exp. Sta. Bul. 373 (Ann. Rept. Director 1923/24): 13. April 1925.

EAR ROT CAUSED BY FUSARIUM SPP.

Twenty-two states, all east of the Great Plains except California, reported Fusarium ear rot. Five states, Delaware, Maryland, Tennessee, Arkansas, and Indiana reported association of the ear rot with ear worm injury. Apparently the ear worm was very active with the result that subsequent rot was prominent. Collaborators reported the following losses from this cause; 4 per cent, Pennsylvania and North Carolina; 2 per cent, Georgia; 1.5 per cent, Illinois; 1 per cent, Maryland and Virginia; 0.5 per cent, Delaware and Indiana.

In California the disease was unusually severe. No estimate of reduction for the state as a whole is given but W. T. Horne reported a large amount of mold of ears and single kernels probably caused by Fusarium moniliforme. He stated that on 40,000 acres a loss of 30 per cent was estimated.

In connection with their annual report, collaborators were asked to give information on the extent to which the Maryland method of selecting seed corn, by cutting off the butts and tips, was being used or tested.

Collaborators in twenty-seven states reported, and twenty-three of them stated that the method was not used. In four, however - Maryland, Pennsylvania, Georgia, and Colorado - the method was used or tested to some extent. Replies to the questionnaire, aside from merely negative answers, are as follows:

Pennsylvania: Yes. We tried out the Maryland method in three demonstration plots. The results were conflicting and all apparently within the range of probable error. As for example in one plot:

	Yield (bushels of dry shelled corn)	
	Total yield	Yield, large disease-free ears
From 200 ears selected from a bin for seed.		
4 with cleanest cob	84.4	47.9
4 with cobs having greatest discoloration	83.4	48.7

(Kirby)

Maryland: This method is being adopted by the grower rather generally. More than 150 tests and demonstrations have been made. From these there has been a rapid spread of influence. (Temple)

Virginia: The Maryland method of selecting seed corn has not been used so far as I know. We have used the improved rag-doll germinator extensively. Results are hard to measure but farmers are generally well pleased. (Fromme)

Georgia (southern): The method is commonly used among growers in general throughout the southern counties. (Boyd)

Illinois: The Maryland method of selecting seed corn has not been used in this state. There are some varieties of corn in this state with which it probably could be used, but by far the greatest amount of corn in this state is of the Yellow Dent type which has a natural internal cob discoloration. In such cobs, it is hardly possible to detect any discoloration due to disease as one could in a cob having a whiter interior. (Tehon)

Nebraska: The universal practice in Nebraska is to shell off the tips and butts, in order to have more uniform size seed and avoid mechanical difficulties. No differences in germination. (Goss)

Colorado: Removal of butt and tip of seed corn is recommended and practiced to some extent. (Durrell)

BACTERIAL WILT CAUSED BY APLANOBACTER STEWARTII (EFS.) MCC.

New York, Maryland, Virginia, West Virginia, Ohio, Indiana, Illinois, and Oklahoma reported this disease in 1925. It was, in general, of only very slight importance and was reported mostly on sweet corn, particularly the Golden Bantam variety. In Maryland, collaborators estimated a 10 per cent infection of Golden Bantam. In Ohio the disease seemed to be more prevalent on field corn than has been the case in recent years. It was first observed August 13 in Washington County, Illinois, and August 17 in Tompkins County, New York.

BROWNSPOT CAUSED BY PHYSODERMA ZEAE-MAYDIS SHAW.

Slight amounts of this disease were reported from states along the Atlantic seaboard from Maryland to Florida, and in Louisiana, Arkansas, Illinois, and Kansas. It was also found and reported by W. H. Weston in the Provinces of Santa Clara and Mantanzas, Cuba. The losses were very slight, being less than 1 per cent in all states. In Florida it was estimated that it infected 2 per cent of the plants in half of the corn fields.

OTHER DISEASES

Head smut caused by Sorosporium reilianum (Kuehn) McAlp. was reported from Idaho, Washington, and California. In Clearwater and Lewis Counties, Idaho, several fields showed the smut. In Washington it was present to a limited extent around Pullman, and in California a trace was observed at Davis.

Downy mildew caused by Sclerospora graminicola (Sacc.) Schroet. The first record of Sclerospora graminicola on corn in this country came from Iowa and has been reported in the Plant Disease Reporter (9: 65. August 15, 1925) and by Melhus and Van Haltern (8, 9). The disease is more noticeable on corn in very early stages and so should be looked for early in the season.

Leaf blight caused by Helminthosporium turcicum Pass. Reported from Maryland, Illinois, and Porto Rico.

Cob rot caused by Basisporium gallarum Moll. was reported from Minnesota (University Farm, one variety had 30 per cent infection, estimated loss for the state between 2 and 3 per cent), and Iowa (more than usual, important, occurring over the whole state and causing a loss estimated at 8 per cent). See references 3 and 4.

Black bundle caused by Cephalosporium acremonium Cda. was reported from Pennsylvania by R. S. Kirby.

Green smut caused by Ustilaginoidea sp. The first report of this fungus on corn has been received by the Plant Disease Survey from C. W. Edgerton from Louisiana. The report was accompanied by a specimen collected September 2. It is not unlikely that it is the same fungus that occurs on rice but before that can be ascertained cross inoculations will be necessary.

Bacterial stalkrot caused by Bacterium dissolvens Rosen. According to

H. R. Rosen, this disease appeared in epidemic form in localized areas in parts of Arkansas. It was very severe during the latter part of June and early July in Independence County. For the state as a whole, much more bacterial stalk rot was reported than usual.

Bacterial diseases (undet.) A bacterial stalk rot thought to be the same as that described by Rosen of Arkansas was reported from Arizona, where it has been observed for the past two years. The disease was locally destructive. In Ohio a bacterial wilt is reported, similar to but apparently distinct from, Aplanobacter stewartii. The disease is being studied in Ohio. A bacterial leafspot was reported from Texas and Idaho (noted in gardens, occurring quite generally).

Kernel mold caused by Aspergillus sp. was reported from Florida and Oklahoma. In the latter state as high as 42 per cent of the ears in some fields were injured.

Leaf and sheath spots caused by various organisms. Considerable spotting of sheaths occurred in Arkansas. (Dept. Plant Path.)

Mosaic caused some damage in Louisiana and occurred in about the normal amounts, according to collaborators.

Recent literature:

1. Drechsler, C. Leaf spot of maize, a disease distinct from leafblight. (Abstract) Phytopath. 15: 47. 1925.

2. ----------- Leafspot of maize caused by Ophiobolus heterostrophus n. sp. the ascigerous stage of a Helminthosporium exhibiting bipolar germination. Jour. Agr. Res. 31: 701-726. Oct. 15, 1925.

3. Durrell, L. W. A preliminary study of fungous action as the cause of down corn. Phytopath. 15: 146-154. 1925.

4. ----------- Basisporium dry rot of corn. Iowa Agr. Exp. Sta. Res. Bul. 84: 138-160. May 1925.

5. Edgerton, C. W., and A. F. Kidder. Fungous infection of seed corn kernels and the importance of germination tests. Louisiana Agr. Exp. Sta. Bul. 193: 1-24. 1925.

6. Johann, Helen, J. R. Holbert, and James G. Dickson. A Pythium seedling blight and root rot of dent corn. (Abstract) Phytopath. 16: 85. Jan. 1926.

7. Koehler, B. Diseases in Illinois seed corn as found in the fifth utility corn show. Illinois Agr. Exp. Sta. Circ. 299: 1-8. July 1925.

8. Melhus, I. E. and F. Van Haltern. Sclerospora on corn in America. Phytopath. 15: 720-721. Nov. 1925.

9. ----------- Sclerospora graminicola on corn. (Abstract) Phytopath. 16: 85-86. Jan. 1926.

10. Storey, H. H. The transmission of streak disease of maize by the leaf hopper Balclutha mbila Naude. Ann. Appl. Biol. 12: 422-439. Nov. 1925.

11. Winter, F. L. The effectiveness of seed corn selection based on ear characters. Jour. Amer. Soc. Agron. 17: 113-118. Feb. 1925.

R I C E

Blast, Piricularia grisea (Cke.) Sacc. Florida, Louisiana, Texas, Arkansas, and Porto Rico reported blast. In Florida it was quite common wherever rice was grown. In Arkansas more than usual occurred, it was of some importance, and was associated with late rice and cool wet weather.

Straighthead (non-par.) was reported from Texas and Arkansas. It was said to be prevalent in Texas, and from Arkansas, V. H. Young reported as follows:

> "More straighthead present than in either of the past two years. Not necessarily on new land. Often without the typical dark green color generally associated with typical straighthead."

Collaborators in Louisiana stated that although the disease had not actually been observed it undoubtedly was present.

Stemrot, Sclerotium oryzae Catt. This disease occurred in Louisiana and Arkansas. In the latter state it was important, occurring in more than the usual amounts and causing a reduction in yield for the state estimated at about 2 per cent. It was rather widespread and all commercial varieties were attacked. V. H. Young (3) has recently reported his observations on this disease.

Black smut, Tilletia horrida Tak. This smut was not reported by collaborators from any of the rice states. Negative reports were received from South Carolina, Georgia, Louisiana, Texas, Arkansas, and California.

Blight, Helminthosporium oryzae Van Breda de Haan. This disease was collected in Florida and Porto Rico. In Florida it seemed to be doing considerable damage to seedling plants in several small rice fields, according to Weber. A spotting of leaves caused by Helminthosporium sp. was common but of little importance in Arkansas.

Speckled blotch, Septoria oryzae Catt., was reported to the Survey for the first time from any state. No specimen accompanied the report. G. F. Weber found it occurring on glumes in a single field in Florida. This disease is known in Italy, Brazil, China, and Japan.

Recent literature on rice diseases:

1. Sundararaman, S. Longevity of paddy Piricularia. Year Book Madras Agr. Dept. 1924: 9. 1925.

2. Winkler, H. Die Schädlinge und Krankheiten des Reises. Tropenpfl. 28: 174-189, 242-255. July-Aug., Sept.-Oct. 1925.

3. Young, V. H. Observations on the stem rot of rice caused by Sclerotium oryzae Catt. (Abstract) Phytopath. 16: 86. Jan. 1926.

F L A X

WILT CAUSED BY FUSARIUM LINI BOLLEY

Wilt was reported from Wisconsin, Minnesota, North Dakota, South Dakota, and Montana. No reports of it were received from collaborators in Michigan. In North and South Dakota and Montana it was of some importance. The percentage losses estimated as due to wilt were North Dakota 10, South Dakota 2, Montana 3, and Minnesota 1.5. The reduced amount of the disease in Minnesota and North Dakota is attributed by collaborators to cool weather; also the fact that resistant varieties are coming into general use in Minnesota probably explains to a considerable extent the freedom from wilt in 1925.

RUST CAUSED BY MELAMPSORA LINI (SCHUM.) DESM.

Rust was prevalent in about the same amount as or less than last year and was reported from Michigan, Wisconsin, Minnesota, North Dakota, and Oregon. From the last named state the disease was reported to the Survey for the first time. For the most part, only traces of loss resulted, but in Minnesota 0.5 per cent, and in North Dakota 2 per cent reductions in yield were estimated. It was first observed June 20 in Brownton, Minn.; July 4, Fargo, N. Dak., and July 20, Madison, Wis.

Recent literature:

1. Hart, Helen. Factors affecting the development of Melampsora lini (Pers.) Desm. (Abstract) Phytopath. 15: 53-54. Jan. 1925.

2. Henry, A. W. Inheritance of immunity from Melampsora lini. (Abstract) Phytopath. 16: 87. Jan. 1926.

3. ---------- and E. C. Stakman. The control of flax rust. (Abstract) Phytopath. 15: 53. 1925.

CANKER (NON-PAR.)

Canker was reported from North Dakota, South Dakota, Montana, and Oregon. In North Dakota it was an important disease causing a loss estimated at 3 per cent for the state, while in Montana a 2 per cent loss was estimated. In Oregon it was serious in some fields, lesions occurring at the bases of stems in mature plants as well as young ones. Cool, moist weather in Oregon, extending well into June, followed by very hot weather during the last of June with a maximum temperature of over 100° F. in most sections of the Willamette Valley favored canker. According to Barss it occurred mostly in late planted fields and on heavy soils. Of 49 fields, containing 650 acres visited, 35 per cent had some heat canker.

PASMO CAUSED BY PHLYCTAENA LINICOLA SPEG.

Minnesota and South Dakota reported pasmo. Less than last year was noted in Minnesota but more, apparently, occurred in North Dakota.

Reference:

1. Baez, J. R. La peste del lino llamada "pasmo." Nuestra Tierra. Buenos Aires. 8: 105-106. April 1925.

OTHER DISEASES

Brown stem (non-par.) This disease, probably due to heat or excess transpiration, or poor root development, was reported by H. P. Barss of Oregon as being of considerable importance in some fields. It caused dark brown or purplish stem tips with poorly developed fiber to 6 or 8 inches or more from the tips, and failure to mature seed.

Yellows (undet.) Yellowing and stunting of plants in the seedling stage was reported by collaborators from Minnesota as more common than last year. It occurred in both high and low parts of fields and was thought possibly to be associated with alkaline soil.

Browning disease caused by Polyspora lini Lafferty. According to Henry (1) this disease has been present in North America at least since 1920. It was found in the field plots at Saskatoon, Canada in 1920 and 1923, and in August 1925 in Michigan. This is the first report of occurrence in the United States as far as the Plant Disease Survey has record.

Reference:

1. Henry, A. W. Browning disease of flax in North America. Phytopath. 15: 807-808. Dec. 1925.

COVERED KERNEL SMUT CAUSED BY SPHACELOTHECA SORGHI (LK.) CLINT.

Reports of the occurrence of this smut were received from South Carolina, Louisiana, Porto Rico, Texas, Minnesota, Kansas, and Colorado. In the last three states it was reported as being prevalent and of considerable importance. In Kansas it was estimated by L. E. Melchers that the loss for the state would probably be 10 per cent of the crop. In that state experiments have been conducted on control by means of copper carbonate with very successful results. Concerning it Melchers writes:

> "Experimental work in the Department of Botany and Plant Pathology of the Kansas Agricultural Experiment Station the past three years has definitely proved the value of copper carbonate for the control of sorghum kernel smut. This is an important finding since it has already been largely adopted over the state. The old formaldehyde treatment was not greatly put into use on account of its being a wet treatment. The control by copper carbonate will mean a million dollars saving each year in Kansas."

Last year a kernel smut attacking milo, feterita, and hegari was reported. More reports of the occurrence of this fungus on these hosts were received during 1925 and indications are that it is spreading. Because of the attack on these varieties, immune to the ordinary kernel smut, it becomes necessary to treat the seed of all sorghum before planting. Indications are that the new strain of smut may be effectively controlled with the copper carbonate dust seed treatment. The problem of breeding for resistant varieties is complicated by the presence of the new form. A report concerning it was given by Tisdale, Melchers, and Clemmer (3) at the Kansas City meeting.

Recent literature:

1. Melchers, L. E. Control of sorghum kernel smut by the copper carbonate method. Kansas Agr. Col., Div. Col. Exten. Leaflet 224: 2 pp. 1925.

2. Reed, G. M., and L. E. Melchers. Sorghum smuts and varietal resistance in sorghums. U. S. Dept. Agr. Bul. 1284: 1-56. Aug. 1925.

3. Tisdale, W. H., L. E. Melchers, and H. J. Clemmer. A strain of sorghum kernel smut which infects milo and hegari. (Abstract) Phytopath. 16: 85. Jan. 1926.

LOOSE KERNEL SMUT CAUSED BY SPHACELOTHECA CRUENTA (KUEHN) POTTER

Loose kernel smut was reported this year only from Texas although it doubtless occurred in numerous other states where sorghum is grown. In

Texas it was said to be prevalent. Faris and Reed (1) have reported successful infection as a result of local inoculations in various parts of plants in different stages of growth.

Reference:

1. Faris, James A., and George M. Reed. Modes of infection of sorghum by loose kernel smut. Mycologia 17: 51-67. 1925.

HEAD SMUT CAUSED BY SOROSPORIUM REILIANUM (KUEHN) MCALP.

Head smut was reported from Minnesota, Kansas, and Texas. In Kansas, Melchers stated that it was never abundant but this year there was even less than usual. Marked variation in susceptibility of different strains was noted in Minnesota.

OTHER DISEASES

Rust caused by Puccinia purpurea Cke. Florida, Louisiana, and Porto Rico reported rust. In Florida it was found infecting the host wherever grown but was not serious.

Anthracnose caused by Colletotrichum sp., probably Colletotrichum lineola Cda., Florida (common but of little importance).

Leafspot caused by Helminthosporium turcicum Pass. Florida (caused considerable firing of lower leaves in a large number of fields).

Stripe caused by Bacterium andropogoni EFS. Kansas (Occurred rather commonly over the state but damage not great; less common than some of the other leaf discolorations and spots), Texas, and Minnesota. In the two last-named states it was reported under the name of Bacillus sorghi.

D I S E A S E S   O F   F O R A G E   C R O P S

A L F A L F A

LEAFSPOT CAUSED BY PSEUDOPEZIZA MEDICAGINIS (LIB.) SACC.

This disease was reported from seventeen states scattered all over the country from the East to the West Coast. In general, it was of the same prevalence as or less than normal, Georgia being the only state that mentioned

more than usual. A number of collaborators attribute the reduced amounts to the dry season. No notes of especial importance concerning this disease were received.

YELLOW LEAF BLOTCH CAUSED BY PYRENOPEZIZA MEDICAGINIS FCKL.

Yellow leaf blotch was reported by collaborators in New York, Georgia, Iowa, Nebraska, Kansas, Idaho, Washington, and Oregon. In addition, it was collected by J. L. Weimer in Maryland, Kentucky, Alabama, Ohio, and Indiana. In Nebraska and Idaho it was more common and destructive than the Pseudopeziza leaf spot. In none of the states, however, with the exception of Georgia, did the damage amount to much. In Georgia it caused defoliation in the majority of alfalfa fields and was considered a very important disease. An estimate of 5 per cent loss for the state was made by J. H. Miller of the College of Agriculture. He wrote that the disease affected the stems of alfalfa and that considerable varietal differences in varietal susceptibility were noted.

DOWNY MILDEW CAUSED BY PERONOSPORA TRIFOLIORUM D BY.

Downy mildew was reported to the Survey from Kentucky, Louisiana, Minnesota, Iowa, Colorado, Arizona, and the Pacific Northwest. It was mentioned as occurring mostly on the first cutting in the majority of states and dates of earliest appearance were: Louisiana, March 20; Arizona, April; Oregon, April 7; Colorado, June; Minnesota, July 10.

Patel (1) exposed 31 species and 16 genera of legumes to infection by this fungus and out of these only two, Medicago sativa and M. lupulina, became infected. He also studied the overwintering and temperature relations of the fungus as well as conditions necessary for germination.

Reference:

1. Patel, M. K. Study of Peronospora trifoliorum DeBy. on species of Leguminosae. (Abstract) Phytopath. 16: 72. Jan. 1926.

NEMATODE, TYLENCHUS DIPSACI (KUEHN) BAST.

This nematode was reported from two new states, Illinois and Nebraska, these reports coming from the Office of Nematology of the Bureau of Plant Industry where specimens were received. This brings the total number of states in which the organism has been found parasitizing alfalfa up to ten, namely: Illinois, Nebraska, Colorado, New Mexico, Arizona, Utah, Idaho, Washington, Oregon, and California. Judging from the reports received for 1925, it would seem that this disease is not proving to be as important as it was feared it might. In several of the states the disease appears to be confined to a few fields of relatively

small area, while in others, such as Colorado, the disease is widespread but apparently has been present for as long a period as 25 years and even now does not seem to be a very serious factor. In fact, Thorne (2) states, concerning its occurrence in Colorado and Utah, that, "It is not a serious menace to the alfalfa industry. Fields are rarely appreciably injured until the fourth or fifth year and under proper rotation system this is long enough to allow alfalfa to remain at one time." The reason the disease was found so widespread in Colorado in 1924 was the special survey which was conducted for it and for the general dying of alfalfa, which was causing great concern to farmers and which was found not to be due to the nematode but to another cause (bacterial crown or root rot).

Recent literature:

1. Gillette, C. P. Alfalfa nematode investigations. In Sixteenth Ann. Rept. State Entomologist Colorado, 1924. Office Colorado State Entomol. Circ. 47: 58-60. June 1925.

2. Noble, R. J. A disease affecting lucerne. Agr. Gaz. New South Wales 36: 827. Nov. 1925.

3. Thorne, Gerald. Report of the outbreak of Tylenchus dipsaci Kuhn, in Colorado and Utah, in 1924. In Sixteenth Ann. Rept. State Entomologist Colorado, 1924. Office Colorado State Entomol. Circ. 47: 61-70. June 1925.

BACTERIAL BLIGHT CAUSED BY BACTERIUM MEDICAGINIS (SACK.) EFS.

Collaborators reported bacterial blight from Kansas, Utah, Idaho, and Oregon. J. L. Weimer, while inspecting alfalfa fields in the middle west, collected it in the additional states of Nebraska, Iowa, Illinois, Indiana, and Ohio. In Idaho it was said to be much more common than usual, causing considerable injury in many parts of the state. In Oregon it was said/not to be very important but widely scattered. B. L. Richards of Utah reports as follows concerning it:

> "The cool wet season has greatly intensified the severity of stem blight of alfalfa. The disease occurred generally on the first crop throughout the entire state. Especially severe in Salt Lake, Cache, and Boxelder Counties. Fields have been observed which show a decreased yield of from 50 to 60 per cent. A high average loss will result for the entire state."

BACTERIAL CROWN AND ROOT ROT CAUSED BY APLANOBACTER INSIDIOSUM MCCULLOCH

This is a new disease which has been reported during the year. A note concerning it has been published by Jones (2) and the organism has been

described by McCulloch (3). What seems to be the same disease has been reported on by Durrell and Sackett (1) and by Sackett (4). In the Plant Disease Reporter (9: 28, 53, 110. 1925.) the disease is mentioned as occurring in Alabama, Mississippi, Indiana, Illinois, Iowa, Nebraska, Kansas, and Colorado. It has also been reported to the Plant Disease Survey from the additional states of New Jersey, Pennsylvania, Michigan, and Missouri. Root rots of undetermined causes which may possibly be the same as this occurred in Minnesota and Oklahoma also, according to collaborators.

Plants affected with bacterial crown and root rot die in groups, causing dead areas which increase in size from year to year. The foliage is sickly and dwarfed, and the tap roots show a brown discoloration under the bark. In advanced cases the bark slips from the woody core, which appears yellow on the outside instead of white. Masses of bacteria fill a large number of the outermost vessels of the wood. A yellowish substance is also present in the xylem vessels.

Work on this disease and its control is being done in a number of states, especially at Madison, Wis., and at Fort Collins, Colo., and in the U. S. Department of Agriculture.

Recent literature:

1. Durrell, L. W., and W. G. Sackett. A root rot of alfalfa. Science n. s. 62: 82-83. July 24, 1925.

2. Jones, Fred Reuel. A new bacterial disease of alfalfa. Phytopath. 15: 243-244. April 1925.

3. McCulloch, Lucia. Aplanobacter insidiosum n. sp., the cause of an alfalfa disease. Phytopath. 15: 496-497. Aug. 1925.

4. Sackett, W. G. Crown or root rot of alfalfa. Through the Leaves 13: 213-214. May 1925.

OTHER DISEASES

Leafspot, Cercospora medicaginis Ell. & Ev. Reported from Georgia, Alabama, Mississippi, and Texas. In Georgia it was reported by J. H. Miller as being found in all alfalfa fields examined in late summer but that it occurred in much less amounts than in previous years owing to the dry season. It was not especially important.

Rust, Uromyces medicaginis Pass. Georgia, Alabama, Mississippi, Louisiana, Texas, Indiana, New Mexico, and Arizona reported rust. In general it did not seem to be of much importance although in Louisiana it was said to cause some loss and in Indiana it was serious in the late fall. In New Mexico, more than last year was noted and it was of some importance, causing considerable loss of leaves. In Arizona it seemed to be rare except in a few isolated places such as along banks of ditches.

Crown wart, Urophlyctis alfalfae (Lagh.) Magn. was reported to the Survey for the first time from Indiana by J. L. Weimer, who collected it at Madison, Ind., June 12. This is not only the only report from Indiana but also the first from east of the Rocky Mountains. A note has been published

concerning it (6). In Oregon collaborators reported crown wart as probably general in the western part of the state, where alfalfa has been established for some time, and undoubtedly a factor in the thinning out of the stand and ultimate failure of the field. The damage that is done is not generally realized by growers.

Root rot, Sclerotinia trifoliorum Eriks. Idaho (only one report of it received this year), and Oregon (less than usual, general in western part of state, first observed April 7, Lane County).

Root rot, Ozonium omnivorum Shear. Texas (very prevalent, 6 per cent loss, especially in Rio Grande Valley and in western Texas under irrigation), Arizona (occurred in southern half of state and caused estimated reduction in yield of 3 per cent. The conidial stage was reported very abundant in the alfalfa fields of Verde Valley).

Stem rot, Sclerotium rolfsii Sacc. Collected at Columbus, Miss., August 4 by J. L. Weimer. This is the first report to the Survey from Mississippi, on this host.

Root rot attributed to Fusarium sp. occurred in Oklahoma (common in fields in the Red River section), Missouri (very destructive in small areas in Boone County), and Idaho (important in isolated cases).

Violet rootrot, Rhizoctonia crocorum (Pers.) DC. Iowa.

Anthracnose, Colletotrichum trifolii Bain, was reported from Mississippi by D. C. Neal, who stated that the disease was undoubtedly held in check this season by the very dry weather. In some years this is a serious disease in Mississippi. Anthracnose was also collected in Kansas by J. L. Weimer in the course of his alfalfa disease survey.

Dodder, Cuscuta sp. Texas, New Mexico, Arizona, and Washington reported trouble with dodder in 1925. In New Mexico it was said to be of considerable importance, smothering the vines and reducing the yield to the extent of 4 per cent for the state. Control measures are being used in an effort to reduce it. Interesting work along the lines of freeing alfalfa seed from dodder by means of dry heat is reported by Staker (2).

Leafspot, Ascochyta imperfecta Pk. Collected in Maryland and Kansas by J. L. Weimer.

Leafspot caused by Macrosporium sp. Louisiana.

Rootknot, Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb). Texas (important where the hairy Peruvian variety is not grown - Taubenhaus).

Yellows. Observed in New Jersey, Pennsylvania, and Maryland during August by J. L. Weimer.

Mosaic (undet.) New York. This is the first report of mosaic on alfalfa to the Plant Disease Survey. More work should be done with it to determine if it is transmissible.

Witches' broom (undet.) Reported from Idaho as causing a slender bushy growth of plants, found in a number of fields in Elmore County.

White spot. Reported from Mississippi. Truog (4) has reported that white spots around the border of older alfalfa leaves, and later in the center of the leaves are produced by lack of potash. Application of 300 to 500 pounds of potash fertilizer per acre is said to correct the condition. It is best applied just previous to sowing and should be worked into the soil thoroughly.

Recent literature:

1. Miller, J. H. Preliminary studies on Pleosphaerulina briosiana. Amer. Jour. Bot. 12: 224-237. April 1925.

2. Patvardhan, G. B. Some hosts of lucerne dodder (Cuscuta chinsisus). Poona Agr. Col. Mag. 17: 152-153. Dec. 1925.

3. Staker, Ernest V. The effect of dry heat on alfalfa seed and its adulterants. Jour. Amer. Soc. Agron. 17: 32-40. 1925.

4. Tehon, L. R., and E. Daniels. A note on the brown leaf-spot of alfalfa. Phytopath. 15: 714-719. Nov. 1925.
   Macrosporium sarcinaeforme (Thyrospora sarcinaeforme)

5. Truog, Emil. Potash starvation symptoms in alfalfa and clover. Better Crops 5(2): 5-7, 35. Oct. 1925.

6. Weimer, J. L. Crown wart of alfalfa in Indiana. Phytopath. 15: 807. Dec. 1925.

CLOVER

Observations concerning the relative susceptibility of various strains of red clover to powdery mildew, anthracnose, root rot, and Macrosporium leaf-spot in Ohio were reported to the Survey in 1925 and have been published in the Plant Disease Reporter (9: 92-93. Oct. 1, 1925). Similar observations made in Delaware by J. F. Adams are given in table 91.

Table 91. Relative susceptibility of red clover strains to disease, as observed in Delaware, 1925.

Source of seed	Amount of infection: Powdery mildew (Erysiphe sp.)	Anthracnose (Gloeosporium caulivorum)	Leafspot (Macrosporium sarcinaeforme)
English	-	Very slight	-
Rumania	Very slight	Slight	Slight
Ohio	Abundant	Very slight	Very slight
Michigan	Medium	Slight	Very slight
Chilean	Very slight	Slight	-
Oregon	Medium	Medium	Very slight
French	-	Abundant	Very slight
Minnesota	Slight	Medium	Very slight
Italian	Slight	Medium	Very slight

"The variation in anthracnose prevalence may be associated with infestation carried by seed or because of greater susceptibility in this environment. Our local clover generally carries a medium amount of anthracnose and leafspot which is of greater prevalence with cool, rainy weather." (Adams)

ANTHRACNOSE CAUSED BY GLOEOSPORIUM CAULIVORUM BERK. AND COLLETOTRICHUM TRIFOLII BAIN

New Jersey, Delaware, Mississippi, Texas, Ohio, Wisconsin, and Idaho reported on these diseases of red clover. In New Jersey and Wisconsin the disease was reported as that caused by _Gloeosporium caulivorum_ while in the other states it was listed under the heading _Colletotrichum trifolii_. Since the symptoms of these two anthracnoses are practically the same diagnosis by macroscopical characters alone is not possible, and it is likely that many incorrect determinations of these diseases have been made. Monteith (1) has compared the two fungi with respect to temperature relations and growth in culture.

Reference:

1. Monteith, John Jr. Colletotrichum trifolii and Gloeosporium caulivorum on clover. (Abstract) Phytopath. 16: 71-72. Jan. 1925.

POWDERY MILDEW CAUSED BY ERYSIPHE POLYGONI DC.

Powdery mildew again was widespread over the country, 1925 being the fifth successive year that the disease has been prevalent in abundance on red clover. The noteworthy feature of this year's occurrence was the increased amount reported from the Pacific Northwest and from Montana. This same form of the mildew was reported from all of these states for the first time in 1924, and in all of them it was said to be much more prevalent this year than then. It was reported for the first time in western Washington this season, it being reported in 1924 from eastern Washington only. The facts that the disease appeared in the Pacific Northwest for the first time, in severe form, lastyear and that it increased considerably during 1925, tend to bear out the theory that this mildew is a new physiologic form which has been introduced into this country, spread rapidly through the eastern states, secured a foothold west of the Rocky Mountains and is now spreading in that region. All states have now reported the mildew as being present with the exception of Wyoming, Nevada, New Mexico, Arizona, and California. It would not be surprising to receive reports of its serious occurrence in some of these states within the next few years.

Collaborators' reports from the Northwest are as follows:

Montana: Has become abundant during the last month. (P. A. Young, Aug. 15)

Idaho: Increasing in importance from year to year. Very widespread, perithecia found only in the irrigated sections in the southern part of the state. (Hungerford)

Washington: Seen for first time this year in western part of state. On alsike, red, and white clovers. Perfect stage collected on alsike and white clovers. (Dept. Plant Path.

Oregon: Widespread, but amount of damage questionable. Practically every field observed white with it. Date of first appearance July 14. Some reports of control by application of sulfur dust. (Barss)

Dates of earliest appearance:

April 16	South Carolina	Clemson College	June 30	Delaware	Newark
May 3	Missouri	Columbia	July 8	Indiana	Lawrence Co.
May 15	New Jersey	Burlington Co.	July 14	Oregon	Corvallis
May 25	Minnesota	Ramsey Co.	July 22	New York	Otsego Co.
June 28	Massachusetts	Lee	Aug. 17	New Hampshire	Milton
June 30	Connecticut	Soundview			

When these dates are compared with those given for some of the other years it will be noted that many of them are comparatively late. The dry summer doubtless had its influence on this powdery mildew.

Table 92. Relative prevalence of powdery mildew of various strains of red clover in test plots at Pennsylvania Agricultural Experiment Station. Notes taken Oct. 5, 1924. (1)

Source of seed	Amount of mildew (per cent) Plat 1	Plat 2	Source of seed	Amount of mildew (per cent) Plat 1	Plat 2
Ohio	30	40	Roumania	5	Trace
Michigan	30	50	Roumania	Trace	Trace
Idaho	30	50	Hungary	Trace	Trace
Oregon	30	50	Finland	5	8
Oregon	30	50	Silesia	Trace	Trace
Canada	30	50	Italy	Trace	Trace
Canada	30	30	Italy	Trace	Trace
England	5	5	Italy	8	5
England	5	Trace	Chile	5	Trace
France	5	Trace	Chile	5	Trace
France	5	Trace			

Reference:

1. Noll, C. F., and C. J. Irwin. Red clover seed in Pennsylvania. Pennsylvania Agr. Exp. Sta. Bul. 200: 1-15. Jan. 1926.

RUSTS CAUSED BY UROMYCES SPP.

Uromyces sp. was reported occurring on clover species in Kentucky, New Jersey (first observed May 15, Mount Holly), and New Mexico (more than usual, trace loss).

Uromyces fallens (Desm.) Kern (reported also as U. trifolii (Hedw. f.) Lév.) was reported on red clover from Connecticut (average amount, 16

reports received), New York (common, trace of loss), Massachusetts (first noted April 19 at Amherst), Iowa (trace) and Minnesota (general, slight importance).

Uromyces trifolii (Hedw. f.) Lév. (reported also as U. hybridi Davis) was reported on alsike clover from Connecticut (average amount, fifteen reports received; first noted May 11 at Stratford), Massachusetts (collected April 28 at Amherst by W. H. Davis), Delaware (average amount, first noted May 13 at Georgetown), South Carolina (specimen collected at Calhoun, received from C. A. Ludwig May 26), and Washington (reported as U. fallens).

Uromyces trifolii (Hedw. f.) Lév. (reported also as U. trifolii-repentis (Cast.) Liro) on white clover collected at Amherst, Mass., by W. H. Davis, April 28; and reported from Connecticut where it was first observed May 11 at Stratford.

Uromyces elegans (Berk.) Lagh. A specimen of Carolina clover (Trifolium carolinianum) was collected by G. F. Weber in northern Florida, and a specimen from Thomas County, Georgia was received from O. C. Boyd, March 30. Concerning the occurrence in the latter state, Boyd reported that 50 per cent of the plants of this species were affected while a dozen clovers, as well as alfalfa, vetch, Melilotus, etc., were free.

ROOT ROT CAUSED BY SCLEROTINIA TRIFOLIORUM ERIKS.

A specimen of crimson clover affected with this fungus was received from F. P. McWhorter of Norfolk, Virginia, who collected it April 1. It was also reported from Washington and Oregon. In the latter state it occurs in the western part, no reports ever having been received from eastern Oregon. The moist winter weather in the western portion favors the production of apothecia and infection. The disease does not spread during the dry season.

Recent literature:

1. Esmarch, F. Das Auswintern des Klees durch Kleekrebs. (Winter injury to clover from canker.) Die Kranke Pflanze 2 (1): 3-6. 1925.

   The winter injury referred to is that caused in the spring after mild winters by the fungus Sclerotinia trifoliorum.

2. Wadham, S. M. Observations on clover rot (Sclerotinia trifoliorum Eriks.). New Phytol. 24: 50-56. 1925.

NEMATODE, TYLENCHUS DIPSACI (KUHN) BASTIAN

This nematode has now been collected on red clover in Utah, Idaho, Washington, and Oregon. Collaborators in Idaho and Oregon reported it in 1925 but no reports of it were received by the Survey from the other two states.

Idaho: More important where it occurs in Twin Falls and Canyon Counties. (Hungerford)

Oregon: Has chiefly been found along the coast in Coos and Lane Counties. In 1924 it was found for the first time in Washington County. (McKay)

Reference:

1. Ware, M. W. A disease of wild white clover caused by the eelworm, Tylenchus dipsaci (Kuhn) Bastian. Ann. Appl. Biol. 12: 113-119. Feb. 1925.

MOSAIC (UNDET.)

New York, New Jersey, and Michigan report mosaic as occurring rather generally on red clover. From Virginia, specimens and reports of the disease on crimson clover were received from F. P. McWhorter of Norfolk. In Indiana it was reported by E. B. Mains as severe in the greenhouse on crimson clover and T. resupinatum, and also noted on T. arvensis and T. subterraneanum. In the variety plots at Lafayette it was observed June 5 on the red clover varieties Indiana, Canadian Lindsay, Idaho 2407, and Minnesota 2398.

OTHER DISEASES

Root rot of red clover caused by Fusarium sp. Reported from Idaho as not very important but causing some damage in isolated cases. In Kentucky Cooper (1) reported work done at the Experiment Station where Fusaria isolated from the roots of tobacco were capable of infecting red and alsike clover when inoculated into the roots of plants growing in artificial media.

Leafspot caused by Pseudopeziza trifolii (Biv.) Fckl. New York (common) and Idaho (of no importance).

Blight caused by Botrytis sp. reported on crimson clover from Delaware by J. F. Adams who observed it as early as May 13.

Bacterial blight caused by Bacterium trifoliorum Jones, Williamson, Wolf, & McC. reported from Indiana and Mississippi. E. B. Mains, reporting for Indiana, stated that it was serious in field plots of red clover at LaFayette, being first noted June 5. A field in Rush County was also heavily infected. In the varietal plots it was noted on the following red clovers: Canadian Ashawa, C. Huron Co., C. Welland, C. Altaswede, Indiana, Chilean C. R. T., Canadian Lindsay, Finnish 56870, English 2399E, Swiss 56896, Idaho 2407, New Zealand 56795, Oregon 23996, Minnesota 2398, Hungarian 56041, Michigan 2399A, German 2399L, Chilean 2394 and 2403, French 2401 and 2399H, Canadian Leamington, Bohemian 2307, Canadian Oxdrift, Latvian 55002, Italian 56880 and 2379.

Sooty spot caused by Phyllachora trifolii (Pers.) Fckl. Delaware (more than usual), Louisiana (about the same as usual, slight importance), and Minnesota (same as usual, negligible).

Leafspot caused by Macrosporium sp. Delaware (collected June 20 at Newark).

Recent literature:

1. Cooper, Thomas. Tobacco brown root-rot. In 37th annual Rept. Kentucky Agr. Exp. Sta. for the year 1924: 29-30. 1925.

2. Jaczewski, A. A. Gribnyia i bakterial 'nyia boliezni klevera. (Fungous and bacterial disease of clover.) Tula 1916: 1-64. 1916.

SWEET CLOVER

Stem spot caused by Mycosphaerella lethalis Stone. New York (found occurring generally in late autumn.)

Leafspot caused by Ascochyta sp. Specimen sent in from Somerset County, Pa. May 28; also reported from New Jersey and Manitoba, Canada.

Mosaic, undet. Found on both the yellow and white sweet clover, was reported occurring very commonly in New York state.

BUR CLOVER

Leafspot caused by Cercospora medicaginis Ell. & Ev. Specimen sent in from Thomas County, Georgia by O. C. Boyd, March 26.

Leafspot caused by Pseudoplea medicaginis Miles. A new disease of bur clover has been described by L. E. Miles (1). The fungus was collected near Auburn, Alabama. It is distinct from similar fungi occurring on alfalfa and clover. All species and varieties of bur clover were affected.

Recent literature:

1. Miles, L. E. A pyrenomycetous leaf spot of bur clover. Phytopath. 15: 677-690. Nov. 1925.
Pseudoplea medicaginis sp. nov.

COWPEA

WILT CAUSED BY FUSARIUM VASINFECTUM TRACHEIPHILUM EFS.

This disease was reported from South Carolina, Alabama, Mississippi,

Texas, Oklahoma, and Missouri. What was probably the same disease was reported from Illinois and California. In South Carolina it was said to be important locally; in Oklahoma, it was more or less prevalent in various sections of the state, especially in the older fields of southeastern Oklahoma; in Illinois, the disease was very important in the southern counties; in Missouri, reports of the loss of two fields, one of six and the other of ten acres, were received; in California, the disease was very important and was worse than in 1924. In some regions it was the limiting factor in the production of the crop and is on the increase on old blackeye bean land. An estimated reduction in yield of 7 per cent was made for California.

BACTERIAL SPOT CAUSED BY BACTERIUM VIGNAE GARDNER & KENDRICK

Gardner and Kendrick (1) have reported further on the bacterial spot of cowpea and lima bean during the year. They first found the disease in 1919, and each year since that time it has been observed.

Indiana: Less than last year, probably a minor disease; first collected in Lawrence County, July 8. It has been found on 23 varieties of cowpea and none have proved resistant. It is also pathogenic to *Vigna catjang*, *V. sesquipedalis*, velvet bean, Adsuki bean, hyacinth bean, and tick trefoil. (Gardner)

Illinois: Apparently not very prevalent or serious, first observed July 22. (Tehon)

Reference:

1. Gardner, M. W., and James B. Kendrick. Bacterial spot of cowpea and lima bean. Jour. Agr. Res. 31: 841-863. Nov. 1, 1925.

LEAFSPOT CAUSED BY AMEROSPORIUM OECONOMICUM ELL. & TR.

Leafspot was reported from Delaware and Florida by J. F. Adams and G. F. Weber, respectively, and from Georgia, Alabama, and Mississippi by J. L. Weimer. No especial damage was reported although in Florida it was said to be of considerable importance.

OTHER DISEASES

Rootknot caused by *Heterodera radicicola* (Greef) Muell. South Carolina (unimportant), Missouri (five acres destroyed on one farm).

Mosaic (undet.) Reported by J. L. Weimer from Georgia and Mississippi, in each of which states a few plants were observed. E. C. Tims also reported it from Louisiana. These are the first reports to the Survey from these three states. Elmer (1), reporting on the transmissibility of

mosaic, succeeded in infecting cowpeas with mosaic from potato, eggplant, cucumber, and crook neck squash by transferring viriferous aphis or mealy bugs from the mosaic plants to the healthy cowpea. He was not able to infect cowpea with aphis which had been feeding on mosaic celery.

Leafspot caused by *Cercospora cruenta* Sacc. Reported from Delaware (less than usual), Florida (common and of importance because of defoliation), Georgia, Alabama, Texas, Indiana (noted on experimental plots), and Porto Rico (common, sometimes severe).

Leafspot caused by *Cladosporium vignae* Gardner. A new leafspot of cowpea has been reported during the year by M. W. Gardner (3) who found it occurring on the Early Buff variety on experimental test plots at Lafayette, Ind. The fungus is seed borne.

Powdery mildew caused by *Erysiphe polygoni* DC. Reported from Florida (on the host wherever it is grown, not important), and New Mexico (common, damage slight).

Stemrot caused by *Corticium vagum* Berk. & Curt. Reported from Florida by G. F. Weber who states that its occurrence was erratic, but that in several fields an average of 60 per cent loss was noted.

Gandrup (2) has recently reported a Rhizoctonia disease of *Vigna oligosperma* which is grown as a cover crop on rubber plantations in East Java, attacking the leaves and young twigs, causing them to drop off.

Leafspot caused by *Cercospora vignae* Racib. Reported by Cook from Porto Rico (not important).

Rust caused by *Uromyces vignae* Barclay. Texas.

Texas rootrot caused by *Ozonium omnivorum* Shear. Texas (less important than in 1924 on account of dry season).

Stemrot caused by *Sclerotium rolfsii* Sacc. Florida (occasional, not found in epidemic form).

Alternaria sp. Florida (common but not important).

Sunscald. Delaware (more).

Chlorosis caused by excess lime, not important, Texas.

Recent literature:

1. Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 39-91. 1925.

2. Gandrup, J. Over een Rhizoctonia-ziekte bij Vigna. Arch. Rubbercult. Nederl.-Ind. 9: 465-473. April 1925.

3. Gardner, Max W. Cladosporium spot of cowpea. Phytopath. 15: 453-462. 1925.

S O Y B E A N

Bacterial blight caused by *Bacterium glycineum* Coerper. J. L. Weimer, who examined fields in several of the southern states during 1925, collected this leafspot in South Carolina, Florida, Georgia, Alabama, Mississippi, and Louisiana. Considerable disease was noted in most of these places but

apparently it was not causing much damage. It was also reported by collaborators from Indiana and Illinois. In the latter state it was said to be serious wherever seen and was probably the most important disease of soybean.

Bacterial pustule caused by Bacterium phaseoli sojense Hedges. Reported from Delaware and the Arlington Experiment Farm, Virginia. At the Arlington Farm considerable differences in varietal susceptibility were noted.

Bacterial blight caused by Bacterium sojae Wolf. Louisiana.

Leafspot caused by Cercospora sp. A species of Cercospora, distinct from Cercospora cruenta, was reported from Louisiana by C. W. Edgerton on August 15 as follows:

> "A Cercospora leafspot appeared in some fields of soybeans in Louisiana in 1925. Spots were very abundant on the leaves, sometimes 100 to 200 on a single leaflet. Some fields were so badly affected that the fields had a yellowish cast. It evidently hindered the growth of the plants to a considerable extent. The variety Laredo was the most seriously affected. Some of the other varieties were hurt but little. This is the first year that this disease has been seen in Louisiana. It looks as if it might become an important disease in some varieties."

J. L. Weimer collected what may be the same disease in South Carolina, Mississippi, and Louisiana during August.

M. Miura (2) has described Cercospora daizu on soybean, the description of which closely resembles the one reported from Louisiana. This fungus has not been definitely reported from this country. Another Cercospora reported on in 1925 is C. kikuchii by Matsumoto and Tomoyasu (1).

Downy mildew caused by Peronospora sojae Wolf. Delaware (commonly found for first time in Sussex County on Wilson variety - Adams), Alabama, Mississippi, and Louisiana.

Stemrot caused by Sclerotium rolfsii Sacc. Observed by J. L. Weimer in South Carolina, Florida, Georgia, Alabama, and Mississippi; also reported by Tims from Louisiana. No particular damage was reported.

Leafspot caused by Septoria glycines Hemmi. What seems to be a new leafspot was reported again from Delaware (being more prevalent than last year - Adams).

Mosaic (undet.) Observed in Alabama and Mississippi by J. L. Weimer and reported from Louisiana and Indiana by collaborators. In the latter state according to Gardner, it was prevalent in the Midwest variety while symptoms were most severe in the Lexington variety.

A condition suggestive of mosaic but termed "chlorosis" was reported by Tehon of Illinois. It caused a white mottling of leaves in parts of Logan County.

An undetermined rootrot or wilt occurred in central Illinois, according to Tehon. The crown was rotted and the plant wilted and died. In a four-acre field in Cumberland County 9.8 per cent of the plants were dead.

Recent literature:

1. Matsumoto, T., and R. Tomoyasu. Studies on purple speck of soybean seed. Ann. Phytopath. Soc. Japan 1: 1-14. 1925.

2. Miura, M. Diseases of principal crops in Manchuria. Bul. So. Manchuria Railway Co., Koshurei; Agr. Exp. Sta. Manchuria 11: 1-56. 1921.

VETCH

Leafspot caused by Ascochyta pisi Lib. Specimen sent in from Jefferson County, Kentucky by W. D. Valleau.

Stemrot caused by Sclerotinia trifoliorum Eriks. Reported from Oregon (less than last year, of very little importance).

Anthracnose caused by Colletotrichum sp. Louisiana (observed March 20).

Downy mildew caused by Peronospora viciae D By. Reported from Washington (first report to the Plant Disease Survey from that state).

Spot caused by Protocoronospora nigricans Atk. & Edg. Reported from the upper peninsula of Michigan, causing serious damage to the seed crop.

Rust caused by Uromyces porosus (Pk.) Jack. Washington on Vicia sp.

HORSEBEAN

An item of some interest is the report of Miyaka (1) that Gibberella saubinetii (Mont.) Sacc. has been found in Japan causing a wilt of horse bean (Vicia faba var. equina).

Reference:

1. Miyaka, C. Gibberella saubinetii (Mont.) Sacc. as a causal fungus of the wilt-disease of horse-bean. Ber. Ohara Inst. Landw. Forsch. 2: 435-442. 1924.

KUDZU

A bacterial leafspot (undet.) was reported by O. C. Boyd from Grady County, Georgia. Considering the general dryness of the season it developed considerably but was of very little economic importance. He first observed it August 27 at Cairo.

G R A S S E S

BROWN PATCH OF TURF ATTRIBUTED TO RHIZOCTONIA SOLANI KUEHN

There are two types of this disease, the large brown patch and the small brown patch. According to Monteith (6) the large type is generally limited to periods of hot, humid weather, while the small-spot type may occur over a much wider range of climatic conditions. Both types were reported from several of the eastern states in 1925. The small-spot form was the more common on the experimental plots at the Arlington Farm, Virginia. As will be seen from the following references considerable attention has been given this disease during the year from the control standpoint.

Recent literature:

1. Godfrey, G. H. Experiments on the control of brown-patch with chlorophenol mercury. Bul. Green Sect. U. S. Golf Assoc. 5: 83-87. April 1925.

2. ---------- Experiments on the control of brown-patch with chlorophenol mercury. Boyce-Thompson Inst. Plant Res. Prof. Paper 1: 1-5. 1925.

3. Monteith, J. Jr. July experiments for control of brown-patch on Arlington experimental turf garden. Bul. Green Sect. U. S. Golf Assoc. 5: 173-176. Aug. 15, 1925.

4. ----------- August experiments for control of brown-patch at Arlington experimental turf garden. Bul. Green Sect. U. S. Golf Assoc. 5: 202-203. Sept. 1925.

5. ----------- The season's experience with chlorophenol mercury as a control for brown-patch. Bul. Green Sect. U. S. Golf Assoc. 5: 272-273. Dec. 16, 1925.

6. ----------- Control of brown-patch in turf. (Abstract) Phytopath. 16: 76. Jan. 1926.

7. Oakley, R. A. Some things we have learned about brown-patch. Bul. Green Sect. U. S. Golf Assoc. 5: 75-77. April 1925.

8. Schardt, Al. Brown-patch control resulting from early-morning work on greens. Bul. Green Sect. U. S. Golf Assoc. 5: 254-255. Nov. 1925.

9. Tilford, P. E. Brown patch of lawnsand golf greens. Ohio Agr. Exp. Sta. Bimonth. Bul. 10: 185-187. Nov.-Dec. 1925.

OTHER DISEASES OF GRASSES

Bacterium andropogoni EFS.
Holcus sorghum sudanensis - Minnesota, New Mexico (reported as Bacillus sorghi)

Cladochytrium graminis Büsgen
Agrostis stolonifera - Connecticut (G. P. Clinton reported it injuring a golf green at Hartford, May 29; young seedlings of creeping bent injured most.)

Claviceps microcephala (Wallr.) Tul.
Agrostis palustris - Ohio.

Claviceps purpurea (Fr.) Tul.
Agropyron repens - Pennsylvania.
Bromus sp. - Washington.
Phalaris arundinacea - Pennsylvania.

Colletotrichum graminicolum (Ces.) Wils.
Agropyron repens - Pennsylvania.
Agrostis palustris - Pennsylvania.
Bromus secalinus - Pennsylvania.
Dactylis glomerata - Pennsylvania.
Poa pratensis - Pennsylvania.
Eleusine indica - Florida.

Ephelis mexicana Fr.
Cenchrus echinatus - Florida.

Erysiphe graminis DC.
Agropyron repens - Pennsylvania.
Poa pratensis - Massachusetts.

Helminthosporium sp.
Dactylis glomerata - Pennsylvania.

Helminthosporium ravenelli Curtis
Sporobolus berteroanus - Florida, Louisiana.

Helminthosporium vagans Drechsler
Poa pratensis - Pennsylvania.

Heterosporium phlei Gregory
Phleum pratense - New York.

Ophiobolus graminis Sacc.
Phleum pratense - New York.

Phyllachora graminis (Pers.) Fckl.
Agropyron repens - Pennsylvania.
Elymus sp. - Wyoming (Yellowstone Park).
Elymus condensatus - Wyoming (Yellowstone Park).
Muhlenbergia sp. - New Mexico.

Physarum cinereum (Myxomycete)
Capriola dactylon - Florida.

Piricularia grisea (Cke.) Sacc.
Syntherisma sanguinalis - New Jersey.

Puccinia clematidis (DC.) Lagh.
Agropyron repens - Pennsylvania.
Elymus condensatus - Washington.

Puccinia epiphylla Wetts.
Poa pratensis - Pennsylvania.

Puccinia hibisciata (Schw.) Kell.
Muhlenbergia sp. - New Mexico.

Puccinia coronata Cda.
Festuca elatior - Pennsylvania.
Notholcus lanatus - Washington.

Puccinia graminis Pers.
Agropyron repens - Pennsylvania.
Agrostis palustris - Connecticut, Pennsylvania.
Bromus secalinus - Pennsylvania.
Dactylis glomerata - Pennsylvania.
Festuca elatior - Pennsylvania.
Phleum pratense - Connecticut, New York, Pennsylvania, Iowa, Washington.
Poa compressa - Pennsylvania.

Rhynchosporium secalis (Oud.) Davis.
Bromus sp. - Oregon.
Dactylis glomerata - Oregon.
Danthonia sp. - Oregon.

Sclerospora graminicola (Sacc.) Schroet.
Chaetochloa magna - Florida (8).
Chaetochloa viridis - Iowa, New Mexico.

Septoria bromi Sacc.
Elymus condensatus - Wyoming (Yellowstone Park).

Sorosporium syntherismae (Peck) Farl.
Panicum sp. - Ohio.

Tilletia guyotiana Hariot
Bromus hordeaceous - Idaho, Washington.

Tylenchus tumefaciens Cobb (unpublished)
Cynodon incompletus - Found in Office of Nematology on material from South Africa.

Urocystis sp. (Probably U. agropyri)
Elymus condensatus - Wyoming (Yellowstone Park).

Urocystis agropyri (Preuss) Schroet.
Agropyron repens - New York.

Ustilago bromivora (Tul.) Fisch.
Bromus tectorum - Washington.

Ustilago neglecta Niessl
Chaetochloa lutescens - Pennsylvania.

Ustilago striaeformis (West.) Niessl
Dactylis glomerata - Pennsylvania.
Phleum pratense - Massachusetts, New York, Pennsylvania.
Poa pratensis - Pennsylvania.

Mosaic (Undet.)
Achyrodes aureum - Iowa.

Miscellaneous references on diseases of grasses:

1. Anon. Stem eel-worm in Bradley grass. So. African Gard. 15: 35. Jan. 1925.

2. Monteith, John Jr. Leafspot of bluegrass. Bul. Green Sect. U. S. Golf Assoc. 5: 198-199. Sept. 1925.

3. ---------- Control of turf diseases with chemicals. Bul. Green Sect. U. S. Golf Assoc. 5: 219-223. Oct. 15, 1925.

4. ---------- Checking the growth of algae on greens. Bul. Green Sect. U. S. Golf Assoc. 5: 218. Oct. 15, 1925.

5. Nisikado, Y. and C. Miyake. Morphological and physiological studies on a new Helminthosporium found on Leptochloa chinensis Nees. Ber. Ohara Inst. Landw. Forsch. 2: 473-490. 1924.

6. ---------- Ueber ein neues Helminthosporium auf Panicum crus-galli L. Ber. Ohara Inst. Landw. Forsch. 2: 597-612. 1925.

7. Shepherd, E. F. S. Le "streak disease" des graminees a Maurice. Rev. Agr. Ile Maurice. July-Aug. 1925: 540-542.

8. Weston, W. H. Jr., and G. F. Weber. Downy mildew (Sclerospora graminicola (Sacc.) Schroet.) on the Everglade Millet (Chaetochloa magna (Griseb) Scribn.). (Abstract) Phytopath. 16: 71. Jan. 1926.

9. Zundel, George L. Notes on the Ustilagineae of Washington. Mycologia 18: 87-89. March-April 1926.

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Supplement 49

Crop Losses from Plant Diseases in the United States in 1925.

November 1, 1926

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

CROP LOSSES FROM PLANT DISEASES IN THE UNITED STATES IN 1925

Plant Disease Reporter
Supplement 49 November 1, 1926

CONTENTS

INTRODUCTORY STATEMENT

With the assistance of its collaborators the Plant Disease Survey herewith presents the ninth annual estimate of losses from plant diseases of some of the more important crops. As has been said before, no claim is made that these figures are accurate for at best they are only approximations. However, they represent the combined judgment of the plant disease workers of the country and as such it is considered that they are valuable.

With the exception of the table on sweet potatoes, where storage diseases are considered by themselves, the methods of calculation are the same as in previous years (See Plant Disease Bulletin, Supplements 6, 12, 24, 36, and 43).

Estimated percentage loss to twelve crops from plant diseases 1919 to 1925.

Crop	1919	1920	1921	1922	1923	1924	1925
Wheat	16.96	11.70	9.2	8.9	11.82	8.87	8.3
Rye	1.74	1.98	1.4	1.9	2.32	2.04	1.84
Barley	5.90	4.60	5.7	4.6	5.69	3.78	11.2
Oats	5.90	4.80	8.6	5.6	6.06	6.79	7.3
Corn	6.41	6.39	8.8	6.0	10.7	9.43	8.1
Potato	19.50	21.70	18.6	21.1	16.20	19.15	21.0
Sweet potato	36.23	25.8	28.3	21.49	20.9	17.72	7.5
Dry bean	3.70	4.3	14.1	16.1	10.0	-	10.2
Cotton	13.59	13.4	15.8	9.2	19.5	12.65	9.1
Apple	11.37	16.5	11.3	22.5	13.20	18.68	12.1
Peach	12.04	19.4	15.3	18.6	6.0	9.41	6.0
Pear	-	-	-	-	7.42	9.37	15.42

Estimated reduction in yield of wheat due to scab (*Gibberella saubinetii*), leaf rust (*Puccinia triticina*), stem rust (*Puccinia graminis*), and bunt (*Tilletia laevis* and *T. tritici*), 1925.

State	Production: 1925 Bushels (000 omitted)	Scab %	Scab Bushels (000 omitted)	Leaf rust %	Leaf rust Bushels (000 omitted)	Stem rust %	Stem rust Bushels (000 omitted)	Bunt %	Bunt Bushels (000 omitted)
Me.	168	-	-	-	-	t	+	-	-
Vt.	42	-	-	-	-	-	-	-	-
Conn.	-	0	0	0.25	+	0.25	+	0	0
N. Y.	5,998	t	+	1.5	95	t	+	1.2	76
N. J.	1,218	0.5	6	t	+	-	-	t	+
Pa.	22,720	0.7	176	0.3	75	0.2	50	3	756
Del.	1,906	t	+	-	-	-	-	4	80
Md.	10,920	0.5	60	1	119	t	+	2	239
Va.	8,946	t	+	t	+	0.3	29	4	391
W. Va.	1,728	t	+	t	+	t	+	-	-
N. C.	4,466	1	50	5	253	0.5	25	1	50
S. C.	506	-	-	2	11	-	-	-	-
Ga.	1,040	0	0	3	33	-	-	-	-
Ohio	24,002	0.1	25	0.1	25	0.1	25	1	255
Ind.	25,700	t	+	t	+	t	+	t	+
Ill.	35,880	0.6	224	1.5	561	t	+	t	+
Mich.	13,996	t	+	0	0	0.5	73	1	147
Wis.	2,414	t	+	1	25	3.5	89	t	+
Minn.	29,110	0.5	171	t	+	11.	3,754	1	341
Iowa	6,952	t	+	5	372	0.1	8	t	+
Mo.	22,077	t	+	-	-	-	-	-	-
N. Dak.	112,378	1	1,284	t	+	5	6,422	2	2,569
S. Dak.	32,378	-	-	0	0	7.5	2,844	2	758
Nebr.	34,150	0	0	t	+	t	+	1	358
Kans.	74,810	0	0	0	0	t	+	6	4,892
Ky.	3,304	0.1	4	0.1	3	0.1	3	t	+
Tenn.	4,588	t	+	1	47	-	-	1	48
Ala.	77	0	0	-	-	-	-	0	0
Miss.	90	0	0	-	-	-	-	0	0
La.		0	0	t	+	t	+	0	0
Texas	6,552	0	0	0.5	34	1.	69	0.5	34
Okla.	28,282	0	0	-	-	-	-	-	-
Ark.	390	0	0	t	+	t	+	3	13
Mont.	34,601	0	0	0	0	t	+	3	1,135
Wyo.	2,624	0	0	0	0	t	+	-	-
Colo.	14,532	0	0	0	0	t	+	15.	2,567
N. Mex.	492	0	0	-	-	-	-	-	-
Ariz.	672	0	0	-	-	t	+	5	36
Utah	5,949	0	0	0.5	31	1	62	1	62
Nev.	468	0	0	-	-	-	-	-	-
Idaho	26,042	0	0	t	+	1	279	3	837
Wash.	36,840	0	0	0	0	t	+	2	763
Oregon	18,900	0	0	t	+	t	+	0.5	96
Calif.	11,457	0	0	1	130	5	651	1	130
U. S.	669,365	0.3	2,000	0.2	1,814	2.	14,383	2.3	16,633

Estimated reduction in yield of wheat due to loose smut (Ustilago tritici), black chaff (Bacterium translucens undulosum), and other diseases, 1925.

State	Estimated reduction in yield due to disease									
	Loose smut		Black chaff		Other diseases		Sum of traces and no data		All diseases	
	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Mo.	t	+	0	0	t	+	3	5	3	5
Vt.	-	-	0	0	t	+	2	+	2	+
Conn.	2	+	0	0	-	-	0.2	+	2.7	+
N. Y.	1.5	95	0	0	0.5	31	0.2	12	4.9	309
N. J.	1	13	0	0	1	12	1.5	19	4	50
Pa.	2.1	529	0	0	3.5	882	0	0	9.8	2,468
Del.	0.5	10	0	0	0.5	10	0.5	10	5.5	110
Md.	3	358	0	0	2	239	0.1	12	8.6	1,027
Va.	3.4	332	0	0	0.5	49	0.2	19	8.4	820
W. Va.	2	36	0	0	t	+	3	54	5	90
N. C.	2	101	0	0	2	101	0	0	11.5	580
S. C.	1	5	0	0	1	5	1	5	5	26
Ga.	2	22	0	0	1	11	0.5	6	6.5	72
Ohio	1.5	382	0	0	3	765	0	0	5.8	1,477
Ind.	1	263	0	0	0.5	132	1	263	2.5	658
Ill.	0.5	187	t	+	0.5	187	1	374	4.1	1,533
Mich.	2.5	366	0	0	-	-	0.5	73	4.5	659
Wis.	t	+	t	+	0.5	13	0.3	8	5.3	135
Minn.	1	341	t	+	1	341	0.2	68	14.7	5,016
Iowa	t	+	t	+	0.5	37	1	74	6.6	491
Mo.	1	240	-	-	-	-	7	1,679	8	1,919
N. Dak.	1.5	1,926	1	1,284	2	2,569	0	0	12.5	16,054
S. Dak.	2	758	t	+	3	1,137	0.1	38	14.6	5,535
Nebr.	1.5	537	t	+	2	717	0.2	72	4.7	1,684
Kans.	0.25	204	0	0	2	1,630	0	0	8.25	6,726
Ky.	2	70	0	0	3	105	0.4	14	5.7	199
Tenn.	t	+	0	0	1	47	0.5	24	3.5	166
Ala.	-	-	0	0	1	1	3	2	4	3
Miss.	-	-	0	0	1	+	2	2	3	2
La.	t	+	0	0	1	+	1	+	2	+
Texas	0.5	34	t	+	2	138	0.2	14	4.7	323
Okla.	-	-	t	+	2	589	2	589	4	1,178
Ark.	4	17	t	+	2	9	1	4	10	43
Mont.	3	1,134	2	756	-	-	0.5	189	8.5	3,214
Wyo.	-	-	-	-	-	-	9	259	9	259
Colo.	0	0	0	0	0	0	0.1	17	15.1	2,584
N. Mex.	-	-	-	-	-	-	6	31	6	31
Ariz.	0.7	5	-	-	-	-	1	7	6.7	48
Utah	1.3	81	-	-	0.5	31	0	0	4.3	267
Nev.	-	-	-	-	-	-	2	9	2	9
Idaho	1.5	419	t	+	1	279	0.2	56	6.7	1,870
Wash.	t	+	0	0	1	382	0.5	191	3.5	1,336
Oregon	t	+	0	0	1	192	0.2	38	1.7	326
Calif.	0	0	0	0	5	651	0	0	12.	1,562
U.S.	1.1	8,465	0.3	2,040	1.5	11,292	0.6	4,237	8.3	60,864

RYE

Estimated reduction in yield of rye due to smut (Urocystis occulta), ergot (Claviceps purpurea), leaf rust (Puccinia dispersa), stem rust (Puccinia graminis), and other diseases, 1925.

State	Production 1925	Estimated reduction in yield due to disease													
		Smut		Ergot		Leaf rust		Stem rust		Other diseases		Sum of traces and no data		All diseases	
	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Mass.	63	-	-	t	+	-	-	-	-	-	-	1	+	1	+
Conn.	76	0	0	-	-	1	1	1	1	-	-	1	+	3	2
N. Y.	610	t	+	t	+	0.5	3	1	6	1	6	0.5	3	3	18
N. J.	792	-	-	t	+	1	8	-	-	t	+	1	8	2	16
Pa.	1,836	1.5	29	0	0	0.5	9	t	+	3.5	68	0	0	5.5	106
Del.	75	-	-	-	-	-	-	t	+	-	-	2	1	2	1
Md.	342	-	-	0	0	1	3	t	+	2	7	0	0	3	10
Va.	432	t	+	t	+	t	+	t	+	1	4	1	4	2	8
W. Va.	130	-	-	-	-	-	-	t	+	-	-	2	2	2	2
N. C.	816	-	-	-	-	-	-	-	-	-	-	2	16	2	16
S. C.	74	-	-	-	-	2	2	0	0	-	-	1	+	3	2
Ga.	186	-	-	-	-	0.1	+	-	-	1	2	-	-	1.1	2
Ohio	990	-	-	1	10	0.1	1	0.1	1	1	10	0	0	2.2	22
Ind.	1,744	-	-	0	0	t	+	0	0	-	-	2	35	2	35
Ill.	1,242	t	+	0	0	0.4	5	0	0	0	0	0.1	1	0.5	6
Mich.	2,700	t	+	t	+	0	0	1	27	-	-	0.5	14	1.5	41
Wis.	3,789	t	+	t	+	t	+	t	+	2	78	0.5	19	2.5	97
Minn.	7,250	0.5	37	0.5	37	t	+	t	+	0.5	36	0	0	1.5	110
Iowa	574	-	-	t	+	t	+	0.2	1	-	-	0.8	4	1	5
Mo.	300	-	-	-	-	t	+	t	+	-	-	-	-	t	+
N. Dak.	15,710	t	+	1	160	0	0	t	+	t	+	1	160	2	320
S. Dak.	1,910	0	0	1	20	0	0	1	20	1	19	0	0	3	59

State	Production 1925 Bushels (000 omitted)	Estimated reduction in yield due to disease													
		Smut		Ergot		Leaf rust		Stem rust		Other diseases		Sum of traces and no data		All diseases	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Nebr.	2,522	0	0	-	-	t	+	0	0	-	-	1	25	1	25
Kans.	383	0	0	0	0	0	0	0	0	0	0	-	-	0	0
Ky.	221	0	0	0.2	1	t	+	[illegible]	0	3	6	0	0	3.2	7
Tenn.	220	-	-	-	-	-	-	0	0	-	-	2	4	2	4
Ala.	8	-	-	-	-	-	-	0	0	-	-	-	-	-	-
Texas	56	-	-	-	-	-	-	0	0	-	-	-	-	-	-
Okla.	396	-	-	-	-	-	-	0	0	-	-	-	-	-	-
Ark.	11	0	0	0	0	t	+	t	+	1	+	1	+	2	+
Mont.	1,400	0	0	-	-	0	0	0	0	-	-	-	-	-	-
Wyo.	564	0	0	-	-	0	0	0	0	-	-	-	-	-	-
Colo.	850	0	0	0	0	0	0	0	0	0	0	-	-	-	-
N. Mex.	4	0	0	-	-	-	-	-	-	+	-	-	-	-	-
Utah	55	0	0	t	+	-	-	-	-	-	-	-	-	t	+
Idaho	60	t	+	t	+	0	0	t	+	-	-	0.5	+	0.5	+
Wash.	165	0	0	-	-	0	0	0	0	-	-	0.5	+	0.5	+
Oregon	140	0	0	0	0	0	0	0	0	0	0	-	-	-	-
U. S.	48,696	0.13	66	0.46	228	0.06	32	0.11	56	0.48	236	0.60	296	1.84	914

BARLEY

Estimated reduction in yield of barley due to stripe (Helminthosporium gramineum), loose smut (Ustilago nuda), and covered smut (Ustilago hordei), 1925.

State	Production: 1925 Bushels (000 omitted)	Estimated reduction in yield due to disease — Stripe %	Stripe Bushels (000 omitted)	Loose smut %	Loose smut Bushels (000 omitted)	Covered smut %	Covered smut Bushels (000 omitted)
Me.	175	-	-	-	-	-	-
N. H.	28	-	-	-	-	-	-
Vt.	320	-	-	-	-	-	-
Conn.		0	0	1.5	+	0.5	+
N. Y.	4,727	t	+	2.5	123	1.5	74
N. J.	27	-	-	-	-	-	-
Pa.	434	t	+	4	21	1.5	8
Del.		t	+	t	+	t	+
Md.	495	t	+	2	10	1	5
Va.	416	0.1	+	3	13	3	13
W. Va.		-	-	-	-	-	-
N. C.	230	-	-	-	-	-	-
S. C.		-	-	-	-	-	-
Ohio	3,410	-	-	-	-	-	-
Ind.	575	-	-	-	-	-	-
Ill.	8,910	3.3	315	3	286	t	+
Mich.	3,087	1.5	48	2	64	t	+
Wis.	16,965	1.2	209	t	+	t	+
Minn.	33,630	0.5	176	1.5	527	0.75	263
Iowa	5,704	2	127	1	63	1	63
Mo.	155	-	-	-	-	-	-
N. Dak.	42,930	1	451	1	451	1	450
S. Dak.	23,608	3	787	1	262	2	525
Nebr.	5,662	-	-	-	-	-	-
Kans.	4,294	t	+	1.5	67	2.5	112
Ky.	156	-	-	2.5	4	5	9
Tenn.	506	-	-	2	11	3	16
Texas	835	t	+	0.5	4	0.5	4
Okla.	1,764	-	-	-	-	-	-
Ark.		0	0	10	+	10	+
Mont.	3,276	-	-	-	-	4	138
Wyo.	1,122	-	-	-	-	-	-
Colo.	8,610	0.25	23	0	0	5	455
N. Mex.	85	-	-	-	-	-	-
Ariz.	700	0	0	1	7	2	15
Utah	774	2	16	-	-	0.1	1
Nev.	384	-	-	-	-	-	-
Idaho	5,456	t	+	t	+	1	55
Wash.	3,094	t	+	-	-	2	63
Oregon	3,168	t	+	t	+	t	+
Calif.	32,240	3	1,495	0.3	149	7	3,488
U. S.	218,002	1.5	3,647	0.8	2,062	2.3	5,757

Estimated reduction in yield of barley due to leaf rust (Puccinia simplex), stem rust (Puccinia graminis), and other diseases, 1925.

State	Leaf rust %	Leaf rust Bushels (000 omitted)	Stem rust %	Stem rust Bushels (000 omitted)	Other diseases %	Other diseases Bushels (000 omitted)	Sum of traces and no data %	Sum of traces and no data Bushels (000 omitted)	All diseases %	All diseases Bushels (000 omitted)
Me.	-	-	-	-	-	-	-	-	-	-
N. H.	-	-	-	-	-	-	-	-	-	-
Vt.	-	-	-	-	-	-	-	-	-	-
Conn.	0.25	+	0.25	+	0	0	0	0	2.5	+
N. Y.	t	+	0.3	15	0.2	10	0.1	5	4.6	227
N. J.	-	-	-	-	-	-	4	1	4	1
Pa.	t	+	t	+	2	10	0.2	1	7.7	40
Del.	-	-	-	-	-	-	2.5	+	2.5	+
Md.	t	+	t	+	t	+	0.2	1	3.2	16
Va.	t	+	t	+	0	0	0.2	1	6.3	27
W. Va.	-	-	t	+	-	-	-	-	t	+
N. C.	-	-	-	-	-	-	-	-	-	-
S. C.	t	+	0	0	-	-	-	-	t	+
Ohio	0.1	3	0.1	3	-	-	3	106	3.2	112
Ind.	0	0	t	+	-	-	4	23	4	23
Ill.	t	+	t	+	t	+	0.3	28	6.6	629
Mich.	0	0	0.2	6	t	+	0.4	13	4.1	131
Wis.	t	+	0.5	87	0.5	87	0.3	52	2.5	435
Minn.	0	0	0.5	175	1	351	0	0	4.25	1,492
Iowa	t	+	2	127	4	253	0	0	10	633
Mo.	-	-	-	-	-	-	6	9	6	9
N. Dak.	0	0	0.75	338	1	450	0	0	4.75	2,140
S. Dak.	0	0	1	262	3	787	0	0	10	2,623
Nebr.	-	-	t	+	-	-	5	298	5	298
Kans.	0	0	t	+	0.5	23	0	0	4.5	202
Ky.	t	+	0	0	-	-	0.2	+	7.7	13
Tenn.	-	-	0	0	-	-	1	5	6	32
Texas	0.5	4	1	9	3.5	32	0	0	6	53
Okla.	-	-	-	-	-	-	-	-	-	-
Ark.	0	0	0	0	1	+	0	0	21	+
Mont.	-	-	0	0	-	-	1	34	5	172
Wyo.	-	-	0	0	-	-	-	-	-	-
Colo.	0	0	0	0	t	+	0.25	23	5.5	501
N. Mex.	-	-	0	0	-	-	-	-	-	-
Ariz.	0	0	0	0	t	+	0.2	1	3.2	23
Utah	-	-	-	-	t	+	0.2	1	2.3	18
Nev.	-	-	-	-	-	-	-	-	-	-
Idaho	-	-	t	+	t	+	0.5	28	1.5	83
Wash.	-	-	0	0	t	+	0.5	16	2.5	79
Oregon	0	0	0	0	1	32	0.5	16	1.5	48
Calif.	-	-	t	+	25	12,457	0	0	35.3	17,589
U. S.	t	7	0.4	1,022	5.9	14,492	0.3	662	11.2	27,649

OATS

Estimated reduction in yield of oats due to loose and covered smuts (Ustilago avenae and U. levis), stem rust (Puccinia graminis), crown rust (Puccinia coronata), and other diseases, 1925.

State	Production: 1925 Bushels (000 omitted)	Estimated reduction in yield due to disease: Loose and covered smut: %	Bushels (000 omitted)	Stem rust: %	Bushels (000 omitted)	Crown rust: %	Bushels (000 omitted)	Other diseases: %	Bushels (000 omitted)	Sum of traces and no data: %	Bushels (000 omitted)	All diseases: %	Bushels (000 omitted)
Me.	6,165	2	126	t	+	t	+	-	-	0.3	19	2.3	145
N. H.	663	-	-	-	-	-	-	-	-	3	20	3	20
Vt.	3,240	-	-	-	-	-	-	-	-	3	100	3	100
Mass.	304	-	-	-	-	-	-	-	-	3	9	3	9
R. I.	66	-	-	-	-	-	-	-	-	3	2	3	2
Conn.	462	2	9	1	5	1	5	-	-	0	0	4	19
N. Y.	37,800	4	1,608	t	+	0.5	201	1.5	603	0	0	6	2,412
N. J.	1,920	2	39	-	-	t	+	t	+	0.5	10	2.5	49
Pa.	42,945	6	2,831	1.5	708	0.5	236	1	472	0	0	9	4,247
Del.	100	t	+	-	-	-	-	-	-	-	-	t	+
Md.	1,856	3	58	t	+	t	+	0.5	10	0.5	9	4	77
Va.	5,826	4	244	t	+	t	+	-	-	0.5	30	4.5	274
W. Va.	5,292	1	54	t	+	t	+	t	+	1	54	2	108
N. C.	4,902	2.5	127	-	-	-	-	-	-	1	50	3.5	177
S. C.	7,182	1.5	110	0	0	-	-	-	-	1	74	2.5	184
Ga.	7,021	5	374	-	-	0.1	7	1	75	0	0	6.1	456
Fla.	182	3	8	-	-	26	66	-	-	0	0	29	74
Ohio	86,362	4	3,644	0.1	91	0.1	91	1	911	0	0	5.2	4,737
Ind.	59,052	t	+	t	+	t	+	-	-	2	1,205	2	1,205
Ill.	151,168	3.4	5,485	t	+	t	+	2.7	4,356	0.2	322	6.3	10,163
Mich.	53,248	2	1,115	0.5	279	t	+	-	-	2	1,115	4.5	2,509
Wis.	126,246	2.5	3,308	1	1,323	1	1,323	0.1	133	0	0	4.6	6,087
Minn.	202,188	5	11,233	t	+	t	+	5	11,232	0	0	10	22,465
Iowa	246,604	5	14,288	0.7	2,000	t	+	8	22,860	0	0	13.7	39,148

State	Production: 1925 Bushels (000 omitted)	Estimated reduction in yield due to disease											
		Loose and covered smut		Stem rust		Crown rust		Other diseases		Sum of traces and no data		All diseases	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Mo.	49,160	-	-	-	-	-	-	-	-	-	-	-	-
N. Dak.	65,205	2	1,354	1	677	t	+	0.5	339	0.2	135	3.7	2,505
S. Dak.	100,198	3	3,303	1	1,101	0	0	5	5,505	0	0	9	9,909
Nebr.	73,953	-	-	t	+	-	-	-	-	3	2,287	3	2,287
Kans.	39,376	0.5	208	0	0	t	+	5	2,085	0.1	42	5.6	2,335
Ky.	5,187	6	334	t	+	t	+	-	-	1	56	7	390
Tenn.	4,862	t	+	t	+	t	+	-	-	4	202	4	202
Ala.	2,227	-	-	-	-	-	-	-	-	4	92	4	92
Miss.	1,615	-	-	-	-	-	-	-	-	4	67	4	67
La.	630	0.5	3	t	+	3	20	1.5	10	0	0	5	33
Texas	13,419	1	141	0.1	14	0.5	70	3	422	0	0	4.6	647
Okla.	26,220	-	-	-	-	-	-	-	-	4	1,092	4	1,092
Ark.	4,176	10	522	t	+	t	+	10	522	0	0	20	1,044
Mont.	14,355	-	-	-	-	0	0	10	1,604	0.5	80	10.5	1,684
Wyo.	4,690	-	-	t	+	0	0	-	-	4	195	4	195
Colo.	6,210	1.5	94	0	0	0	0	0	0	0	0	1.5	94
N. Mex.	720	-	-	-	-	0	0	-	-	-	-	-	-
Ariz.	360	2	7	t	+	0	0	t	+	0.5	2	2.5	9
Utah	3,196	5	169	-	-	-	-	-	-	0.5	17	5.5	186
Nev.	90	-	-	-	-	-	-	-	-	-	-	-	-
Idaho	8,330	2	170	t	+	-	-	-	-	0	0	2	170
Wash.	11,176	0.5	56	t	+	-	-	-	-	0.5	56	1	112
Oregon	10,560	2	216	0	0	t	+	-	-	0.5	54	2.5	270
Calif.	5,194	0.5	29	2	115	3	172	4	229	0	0	9.5	545
U. S.	1,501,909	3.2	51,267	0.4	6,313	0.1	2,191	3.2	51,368	0.4	7,396	7.3	118,535

Estimated reduction in yield of corn due to smut (Ustilago zeae), leaf rust (Puccinia sorghi), and brown spot (Physoderma zeae-maydis), 1925.

State	Production 1925 Bushels (000 omitted)	Estimated reduction in yield due to disease					
		Smut		Leaf rust		Brown spot	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Me.	585	t	+	-	-	0	0
N. H.	750	-	-	-	-	0	0
Vt.	4,080	-	-	-	-	0	0
Mass.	2,100	-	-	-	-	0	0
R. I.	405	-	-	-	-	0	0
Conn.	2,850	3	89	-	-	0	0
N. Y.	24,876	2	518	t	+	0	0
N. J.	10,712	1	112	-	-	0	0
Pa.	72,471	2	1,629	t	+	0	0
Del.	5,365	0.5	28	-	-	-	-
Md.	25,560	1.5	438	t	+	t	+
Va.	36,058	1	396	t	+	t	+
W. Va.	18,469	1	195	-	-	-	-
N. C.	42,014	2.5	1,219	2	975	0.3	146
S. C.	19,483	-	-	-	-	-	-
Ga.	41,676	0.2	92	0.1	46	0.5	231
Fla.	8,700	1	91	t	+	1	91
Ohio	177,936	3	5,740	t	+	-	-
Ind.	201,318	0.25	551	-	-	-	-
Ill.	388,080	0.2	837	t	+	0.1	418
Mich.	65,680	1	677	t	+	0	0
Wis.	99,556	0.5	515	0	0	0	0
Minn.	156,852	2	3,337	0	0	0	0
Iowa	478,590	4	22,790	2	11,395	-	-
Mo.	201,338	-	-	-	-	-	-
N. Dak.	24,816	4	1,045	t	+	0	0
S. Dak.	83,405	1	1,005	t	+	0	0
Nebr.	236,600	-	-	t	+	-	-
Kans.	104,643	5.5	6,503	0	0	t	+
Ky.	84,800	0.5	470	t	+	0	0
Tenn.	63,240	1	695	t	+	-	-
Ala.	37,760	-	-	-	-	-	-
Miss.	35,586	-	-	-	-	-	-
La.	22,050	t	+	t	+	0.5	120
Texas	26,809	t	+	t	+	0	0
Okla.	19,185	-	-	t	+	-	-
Ark.	28,084	t	+	t	+	t	+
Mont.	6,584	-	-	-	-	0	0
Wyo.	4,393	-	-	-	-	0	0
Colo.	22,410	0.25	56	t	+	0	0
N. Mex.	3,150	-	-	-	-	0	0
Ariz.	780	4	32	0	0	0	0
Utah	419	1	4	-	-	0	0
Nev.	50	-	-	-	-	0	0
Idaho	3,198	t	+	-	-	0	0
Wash.	2,030	0.5	10	-	-	0	0
Oregon	2,059	-	-	0	0	0	0
Calif.	3,026	-	-	-	-	0	0
U. S.	2,900,581	1.6	49,074	0.4	12,416	t	1,006

Estimated reduction in yield of corn due to rootrot (Gibberella saubinetii), ear rots (Fusarium sp.) and other diseases, 1926.

State	Estimated reduction in yield due to disease									
	Root rots		Ear rots		Other diseases		Sum of traces and no data		All diseases	
	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Me.	t	+	-	-	-	-	-	-	t	+
N. H.	-	-	-	-	-	-	-	-	-	-
Vt.	-	-	-	-	-	-	-	-	-	-
Mass.	-	-	-	-	-	-	-	-	-	-
R. I.	-	-	-	-	-	-	-	-	-	-
Conn.	0.25	7	0.75	22	-	-	0	0	4	118
N. Y.	-	-	-	-	-	-	2	518	4	1,036
N. J.	2	223	1	111	-	-	0	0	4	446
Pa.	4	3,257	4	3,257	1	814	0	0	11	8,957
Del.	1.5	83	1.5	83	-	-	0	0	3.5	194
Md.	7	2,045	3	876	1	292	0	0	12.5	3,651
Va.	4	1,585	4	1,585	0	0	0	0	9	3,566
W. Va.	2	389	1	194	1	194	0	0	5	972
N. C.	3	1,462	6	2,924	-	-	0	0	13.8	6,726
S. C.	-	-	-	-	-	-	-	-	-	-
Ga.	2	924	5	2,310	2	924	-	-	9.8	4,527
Fla.	-	-	-	-	-	-	3	275	5	457
Ohio	0.5	957	2	3,826	1.5	2,870	0	0	7	13,393
Ind.	5	11,031	3.5	7,722	-	-	0	0	8.75	19,304
Ill.	5	20,932	2	8,373	t	+	0	0	7.3	30,560
Mich.	1	678	0.5	338	-	-	0.5	338	3	2,031
Wis.	3	3,095	t	+	t	+	0	0	3.5	3,610
Minn.	1	1,668	3	5,006	t	+	0	0	6	10,011
Iowa	t	+	10	56,975	-	-	0	0	16	91,160
Mo.	-	-	-	-	-	-	-	-	-	-
N. Dak.	t	+	t	+	t	+	1	261	5	1,306
S. Dak.	8	8,039	4	4,019	4	4,019	0	0	17	17,082
Nebr.	-	-	-	-	-	-	-	-	t	+
Kans.	5	5,912	1	1,182	t	+	t	+	11.5	13,597
Ky.	8	7,529	1.4	1,318	-	-	0	0	9.9	9,317
Tenn.	5	3,474	1	695	-	-	2	1,390	9	6,254
Ala.	-	-	-	-	-	-	-	-	-	-
Miss.	-	-	-	-	-	-	-	-	-	-
La.	5	1,198	2	479	0.5	120	0	0	8	1,917
Texas	0	0	2	562	2	561	0.5	140	4.5	1,263
Okla.	-	-	-	-	-	-	-	-	t	+
Ark.	0	0	2	607	5	1,518	0.5	152	7.5	2,277
Mont.	-	-	-	-	-	-	-	-	-	-
Wyo.	-	-	-	-	-	-	-	-	-	-
Colo.	0	0	0	0	0	0	0	0	0.25	56
N. Mex.	-	-	-	-	-	-	-	-	-	-
Ariz.	0	0	0	0	t	+	0	0	4	32
Utah	-	-	-	-	-	-	-	-	1	4
Nev.	-	-	-	-	-	-	-	-	-	-
Idaho	t	+	t	+	-	-	0.5	16	0.5	16
Wash.	-	-	-	-	-	-	1.5	31	2	41
Oregon	-	-	-	-	-	-	-	-	-	-
Calif.	-	-	8	272	-	-	3	102	11	374
U. S.	2.4	74,488	3.2	102,736	0.4	11,312	0.1	3,223	8.1	254,255

POTATO

Estimated reduction in yield of potato due to mosaic, leaf roll, late blight (*Phytophthora infestans*), rhizoctonia (*Rhizoctonia solani*), blackleg (*Bacillus phytophthorus*), and fusarium wilt (*Fusarium oxysporum*), 1925.

State	Production 1925 Bushels (000 omitted)	Mosaic %	Mosaic Bushels (000 omitted)	Leaf roll %	Leaf roll Bushels (000 omitted)	Late blight %	Late blight Bushels (000 omitted)	Rhizoctonia %	Rhizoctonia Bushels (000 omitted)	Blackleg %	Blackleg Bushels (000 omitted)	Fusarium wilt %	Fusarium wilt Bushels (000 omitted)
Me.	34,170	3	1,258	1	419	5	2,096	t	+	5	2,096	0	0
N. H.	1,595	10	196	5	98	1	20	t	+	-	-	0	0
Vt.	2,625	-	-	-	-	-	-	-	-	-	-	0	0
Mass.	2,100	3	70	3	70	t	+	2	47	t	+	-	-
R. I.	280	-	-	-	-	-	-	-	-	t	+	-	-
Conn.	2,025	0.25	5	t	+	0.5	11	0.25	5	0.25	5	-	-
N. Y.	23,994	3	1,575	4	2,100	20	10,501	4	2,100	0.3	158	t	+
N. J.	6,042	-	-	6	465	0	0	3	232	t	+	t	+
Pa.	25,461	5	1,720	4	1,376	4	1,376	3	1,033	t	+	t	+
Del.	384	0.5	2	0.5	2	0	0	-	-	-	-	-	-
Md.	3,212	10	434	2	87	3	130	3	130	1	43	0.5	22
Va.	11,340	1	138	t	+	0	0	2	277	1	138	t	+
W. Va.	4,089	t	+	t	+	t	+	t	+	1	53	t	+
N. C.	4,524	5	281	1	56	1	56	2	112	1	56	-	-
S. C.	2,175	-	-	-	-	t	+	10	283	-	-	1	28
Ga.	833	4	39	1	9	t	+	0.1	1	0	0	0.1	1
Fla.	2,599	-	-	-	-	-	-	-	-	-	-	-	-
Ohio	11,978	3	482	5	804	0.5	80	4	643	1	161	0.5	80
Ind.	4,150	0.5	24	4	189	0	0	-	-	0.1	4	0.5	24
Ill.	4,560	-	-	-	-	0	0	-	-	-	-	-	-
Mich.	24,411	1	281	1	281	t	+	5	1,403	t	+	1	280
Wis.	23,632	t	+	t	+	t	+	2	525	t	+	t	+

State	Production 1925 Bushels (000 omitted)	Mosaic %	Mosaic Bushels (000 omitted)	Leaf roll %	Leaf roll Bushels (000 omitted)	Late blight %	Late blight Bushels (000 omitted)	Rhizoctonia %	Rhizoctonia Bushels (000 omitted)	Blackleg %	Blackleg Bushels (000 omitted)	Fusarium wilt %	Fusarium wilt Bushels (000 omitted)
Minn.	26,772	1	315	t	+	0	0	4	1,260	3	945	t	+
Iowa	5,229	2	145	t	+	t	+	10	726	3	218	-	-
Mo.	5,016	-	-	-	-	0	0	-	-	-	-	-	-
N. Dak.	6,160	1	70	t	+	0	0	4	282	2	141	-	-
S. Dak.	3,965	4	205	2.5	128	0	0	4	205	1	51	-	-
Nebr.	6,300	t	+	-	-	0	0	-	-	-	-	-	-
Kans.	3,618	2	100	t	+	0	0	8	402	3	151	-	-
Ky.	2,760	10	472	15	708	0	0	5	236	t	+	0.5	23
Tenn.	2,072	3	70	-	-	0	0	0	0	0	0	-	-
Ala.	1,425	2.5	41	-	-	0	0	-	-	-	-	1	16
Miss.	670	-	-	-	-	0	0	-	-	-	-	-	-
La.	1,800	15	353	t	+	0	0	-	-	-	-	0.5	12
Texas	1,378	0.1	2	t	+	0	0	0.5	7	0	0	0.5	7
Okla.	2,808	-	-	-	-	0	0	-	-	0	0	-	-
Ark.	1,680	15	365	3	73	0	0	-	-	t	+	t	+
Mont.	3,780	-	-	-	-	0	0	-	-	-	-	-	-
Wyo.	1,080	-	-	-	-	0	0	-	-	-	-	-	-
Colo.	14,190	-	-	-	-	0	0	-	-	-	-	-	-
N. Mex.	150	2	4	4	8	0	0	-	-	1	2	4	8
Ariz.	171	0	0	0	0	0	0	5	9	0.5	1	2	4
Utah	2,700	9	298	2	66	0	0	3	99	0.5	17	3	99
Nev.	900	-	-	-	-	0	0	-	-	-	-	-	-
Idaho	13,132	8.5	1,337	1.5	236	0	0	3	472	0.5	78	0.5	78
Wash.	7,830	10	910	2	182	0	0	2	182	t	+	t	+
Oregon	4,368	5	263	t	+	0	0	8	421	0.5	26	0.5	26
Calif.	6,510	3	233	6	466	0.1	8	3	233	t	+	2	155
U. S.	323,243	2.9	11,688	1.9	7,823	3.5	14,278	2.8	11,325	1.1	4,344	0.2	863

POTATO (continued).

Estimated reduction in yield of potato due to tipburn and hopperburn, early blight (*Alternaria solani*), and other diseases, 1925.

State	Production 1925 Bushels (000 omitted)	Tipburn and hopperburn %	Tipburn and hopperburn Bushels (000 omitted)	Early blight %	Early blight Bushels (000 omitted)	Other diseases %	Other diseases Bushels (000 omitted)	Sum of traces and no data %	Sum of traces and no data Bushels (000 omitted)	All diseases %	All diseases Bushels (000 omitted)
Me.	34,170	-	-	2	839	2	838	0.5	210	18.5	7,756
N. H.	1,595	2	40	t	+	-	-	1	20	19	374
Vt.	2,625	-	-	-	-	-	-	-	-	-	-
Mass.	2,100	0.5	12	t	+	2	47	-	-	10.5	246
R. I.	280	-	-	-	-	-	-	-	-	t	+
Conn.	2,025	0.25	5	0.25	5	0.75	16	1	21	3.5	73
N. Y.	23,994	10	5,250	t	+	12	6,300	1	525	54.3	28,509
N. J.	6,042	5	387	0.5	39	7	542	0.5	39	22	1,704
Pa.	25,461	5	1,720	t	+	4	1,376	1	344	26	8,945
Del.	384	-	-	1.5	5	1	4	-	-	3.5	13
Md.	3,212	1	43	0.5	22	5	217	-	-	26	1,128
Va.	11,340	5	692	1	138	7	968	1	138	18	2,489
W. Va.	4,089	17	903	t	+	t	+	5	265	23	1,221
N. C.	4,524	3	169	1.5	84	5	281	t	+	19.5	1,095
S. C.	2,175	1	28	1	28	5	141	5	141	23	649
Ga.	833	5	48	0.1	1	3.2	31	-	-	13.5	130
Fla.	2,599	-	-	-	-	-	-	-	-	-	-
Ohio	11,978	5	804	1.5	241	-	-	5	804	25.5	4,099
Ind.	4,150	5	236	-	-	-	-	2	94	12.1	571
Ill.	4,560	-	-	-	-	-	-	-	-	-	-
Mich.	24,411	1	280	1	280	-	-	3	842	13	3,647
Wis.	23,632	5	1,313	t	+	1	262	2	525	10	2,625

State	Production: 1925 Bushels (000 omitted)	Estimated reduction in yield due to disease									
		Tipburn and hopperburn		Early blight		Other diseases		Sum of traces and no data		All diseases	
		%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Minn.	26,772	5	1,574	t	+	1	315	1	315	15	4,724
Iowa	5,229	-	-	t	+	9	654	4	290	28	2,033
Mo.	5,016	-	-	-	-	-	-	-	-	-	-
N. Dak.	6,160	3	211	t	+	2	141	0.5	35	12.5	880
S. Dak.	3,965	6	307	t	+	2	102	3	153	22.5	1,151
Nebr.	6,300	-	-	-	-	-	-	-	-	-	-
Kans.	3,618	t	+	t	+	12	603	3	151	28	1,407
Ky.	2,760	t	+	t	+	10	472	1	47	41.5	1,958
Tenn.	2,072	2	46	-	-	-	-	6	140	11	256
Ala.	1,425	-	-	1	16	3	49	5	81	12.5	203
Miss.	670	-	-	-	-	-	-	-	-	-	-
La.	1,800	-	-	1	23	4	94	3	70	23.5	552
Texas	1,378	4	61	1	15	3	45	t	+	9.1	137
Okla.	2,808	-	-	-	-	-	-	-	-	-	-
Ark.	1,680	10	243	t	+	1	24	2	49	31	754
Mont.	3,780	-	-	-	-	-	-	-	-	-	-
Wyo.	1,680	-	-	-	-	-	-	-	-	-	-
Colo.	14,190	-	-	-	-	-	-	-	-	-	-
N. Mex.	150	4	8	6	11	2	4	1	2	24	47
Ariz.	171	1.5	3	2	4	t	+	-	-	11	21
Utah	2,700	t	+	t	+	-	-	1	33	18.5	612
Nev.	900	-	-	-	-	-	-	-	-	-	-
Idaho	13,132	t	+	t	+	2	315	0.5	78	16.5	2,594
Wash.	7,830	0	0	-	-	-	-	-	-	14	1,274
Oregon	4,368	t	+	t	+	3	158	-	-	17	894
Calif.	6,510	-	-	-	-	1	77	1	77	16.1	1,249
U. S.	323,243	3.5	14,383	0.4	1,751	3.4	14,076	1.3	5,489	21	86,020

SWEET POTATO

Estimated reduction in yield of sweet potato due to stem rot (Fusarium hyperoxysporum and F. batatatis), foot rot (Plenodomus destruens), and black rot (Sphaeronema fimbriatum), 1925.

State	Production 1925 Bushels (000 omitted)	Stem rot %	Stem rot Bushels (000 omitted)	Foot rot %	Foot rot Bushels (000 omitted)	Blackrot %	Blackrot Bushels (000 omitted)
N. J.	2,106	30	990	0	0	0.2	7
Pa.	230	-	-	0	0	-	-
Del.	1,210	10	137	0	0	0.5	7
Md.	1,290	4	55	t	+	2	28
Va.	3,996	5	215	t	+	1	43
W. Va.	276	-	-	0	0	-	-
N. C.	7,040	1	76	3	227	2	151
S. C.	2,860	t	+	t	+	2	59
Ga.	5,170	2	110	0	0	1	55
Fla.	2,465	-	-	0	0	t	+
Ohio	345	-	-	-	-	-	-
Ind.	216	1	2	0	0	t	+
Ill.	704	-	-	0	0	-	-
Iowa	327	10	38	0	0	5	19
Mo.	570	-	-	-	-	-	-
Kans.	348	2	7	t	+	0.5	2
Ky.	1,260	t	+	-	-	5	67
Tenn.	3,240	1	35	0	0	5	172
Ala.	4,550	3	149	0	0	3.5	174
Miss.	5,952	3	192	t	+	2	128
La.	5,760	t	+	0	0	1	59
Texas	6,132	0	0	0	0	5	330
Okla.	1,880	-	-	-	-	4	80
Ark.	3,060	2	67	0	0	4	133
N. Mex.	140	-	-	0	0	t	+
Ariz.	260	0.5	1	0	0	7	20
Calif.	1,107	2	23	0	0	2	23
U. S.	62,494	3.1	2,097	0.3	227	2.3	1,557

SWEET POTATO (continued)

Estimated reduction in yield of sweet potato due to pox (Cystospora batata), other diseases, and storage rots, 1925.

State	Pox %	Pox Bushels (000 omitted)	Other diseases %	Other diseases Bushels (000 omitted)	Sum of traces and no data %	Sum of traces and no data Bushels (000 omitted)	All diseases %	All diseases Bushels (000 omitted)	Storage rots %	Storage rots Bushels (000 omitted)
	Estimated reduction in yield due to disease									
N. J.	5	165	1	33	0	0	36.2	1,195	4	84
Pa.	-	-	-	-	-	-	-	-	-	-
Del.	1	14	0.5	7	0	0	12	165	5	60
Md.	0.5	7	0.5	7	0	0	7+	97	8	103
Va.	t	+	0.5	21	0.5	21	7+	300	5	200
W. Va.	0	0	-	-	-	-	-	-	-	-
N. C.	0	0	1	76	0	0	7	530	6	422
S. C.	t	+	t	+	0.5	14	2.5+	73	10	286
Ga.	0	0	3	165	0	0	6	330	15	775
Fla.	0	0	-	-	1	25	1+	25	8	197
Ohio	0	0	-	-	2	7	2	7	3	10
Ind.	0	0	-	-	1	2	2+	4	3	6
Ill.	0	0	-	--	2	14	2	14	3	21
Iowa	0	0	-	-	-	-	15	57	5	16
Mo.	0	0	-	-	10	63	10	63	-	-
Kans.	t	+	1	4	0.5	2	4	15	3	10
Ky.	-	-	-	-	1	13	6+	80	30	378
Tenn.	0	0	-	-	-	-	6	207	10	324
Ala.	-	-	2	100	t	+	8.5+	423	5	228
Miss.	t	+	2	128	t	+	7+	448	11	655
La.	t	+	-	-	1	59	2+	118	9	518
Texas	0	0	2	132	0	0	7	462	10	613
Okla.	t	+	-	-	2	40	6	120	10	188
Ark.	2	67	-	-	-	-	8	267	30	918
N. Mex.	-	-	1	2	0.5	+	1.5	2	1	1
Ariz.	0	0	3	9	0	0	10.5	30	10	26
Calif.	t	+	-	-	0.2	2	4.2	48	t	+
U. S.	0.4	253	1	684	0.4	262	7.5	5,080	9.7	6,039

Estimated percentage reduction in yield of tomatoes due to blight (Septoria lycopersici), fusarium wilt (Fusarium lycopersici), bacterial wilt (Bacillus solanacearum), early blight (Alternaria solani), and other diseases, 1925. (Production figures not available.)

State	Estimated reduction in yield due to disease						
	Blight	Fusarium wilt	Bacterial wilt	Early blight	Other diseases	Sum of traces & no data	All diseases
Me.	t	0	0	1	-	2	3
N. H.	t	0	0	t	-	3	3
Vt.	t	0	0	-	-	3	3
Mass.	t	0	0	1	10	t	11
R. I.	t	0	0	-	-	-	t
Conn.	t	-	0	-	5	2	7
N. Y.	t	1	0	3	10	0.5	14.5
N. J.	5	8	0	t	5	0.5	18.5
Del.	15	t	-	0.5	5	0.7	21.2
Md.	15	7	0.5	t	4	0.3	26.8
Va.	5	3	t	5	4	0.1	17.1
W. Va.	3	t	0	1	15	0.2	19.2
N. C.	1	6	3	t	10	0.3	20.3
S. C.	t	5	10	t	10	1	26
Ga.	t	5	1	5	15	0.2	26.2
Fla.	t	3	1	15	7	0.1	26.1
Ohio	0.5	6	-	-	10	2	18.5
Ind.	10	0.2	-	0.1	1	0	11.3
Ill.	8	10	-	-	-	3	21
Mich.	4	t	0	1.5	3	0	8.5
Wis.	5	t	0	t	1	0.5	6.5
Minn.	t	0	0	t	5	1	6
Iowa	8	-	0	t	2	1	11
Mo.	5	5	-	-	-	4	14
N. Dak.	t	t	-	t	0.5	2	2.5
S. Dak.	t	t	0	t	-	2	2
Nebr.	-	-	0	-	-	3	3
Kans.	3.5	10	0	t	3	0.5	17
Ky.	20	4	0	t	5	0.5	29.5
Tenn.	3	15	-	-	-	2	20
Ala.	2	12	0.5	0.5	2.5	0	17.5
Miss.	1	10	2	5	-	2	20
La.	t	15	5	10	-	2	32
Texas	1	3	0	1	5	0	10
Okla.	-	10	0	-	-	5	15
Ark.	10	15	0	t	2	-	27
Mont.	0	0	0	0	-	4	4
Colo.	t	-	0	0	-	4	4
N. Mex.	4	-	0	0	12	11	27
Ariz.	0	12	5	0	-	6	23
Utah	0	3	0	0	5	-	8
Nev.	0	-	0	0	-	12	12
Idaho	t	0	0	0	2	8.1	10.1
Wash.	0	t	0	0	5	15	20
Oregon	0	-	0	-	-	15	15
Calif.	0	-	-	t	10	27	37

COTTON

Estimated reduction in yield of cotton due to anthracnose (Colletotrichum gossypii), angular leafspot (Bacterium malvacearum), wilt (Fusarium vasinfectum), rootknot (Heterodera radicicola), and other diseases, 1925.

State	Production 1925 Bales (000 omitted)	Anthracnose %	Anthracnose Bales (000 omitted)	Angular leafspot %	Angular leafspot Bales (000 omitted)	Wilt %	Wilt Bales (000 omitted)	Rootknot %	Rootknot Bales (000 omitted)	Other diseases %	Other diseases Bales (000 omitted)	Sum of traces and no data %	Sum of traces and no data Bales (000 omitted)	All Diseases %	All Diseases Bales (000 omitted)
Va.	50	0.5	+	t	+	1	+	t	+	t	+	-	-	1.5	+
N. C.	1,090	1	12	1	12	2	23	1	12	2	23	-	-	7	82
S. C.	875	t	+	t	+	5	46	t	+	t	+	1	9	6	55
Ga.	1,150	0.1	1	1	13	2	25	2	25	1	12	2	25	8.1	101
*Fla.	40	-	-	-	-	-	-	-	-	-	-	-	-	-	+
*Mo.	260	-	-	-	-	-	-	-	-	-	-	-	-	-	-
*Tenn.	490	-	-	-	-	-	-	-	-	-	-	-	-	-	+
Ala.	1,335	t	+	1.5	21	4	58	-	-	1.5	21	-	-	7	100
*Miss.	1,930	-	-	-	-	-	-	-	-	-	-	-	-	-	+
La.	900	1	9	0.5	5	1	9	t	+	-	-	-	-	2.5	23
Texas	4,100	0	0	4	184	1	46	1	46	5	230	-	-	11	506
*Okla.	1,550	-	-	-	-	-	-	-	-	-	-	-	-	-	+
Ark.	1,530	t	+	3	53	3	53	2	35	5	87	-	-	13	228
N. Mex.	61	-	-	2	1	-	-	3	2	10	7	-	-	15	10
Ariz.	94	0	0	3	3	1	1	t	+	8	8	-	-	12	12
*Calif.	126	-	-	-	-	-	-	-	-	-	-	-	-	-	+
*All others	22	-	-	-		-	-	-	-	-	-	-	-	-	+
U. S.	15,603	0.2	22	2.4	292	2.1	261	1	120	3.1	388	0.3	34	9.1	1,117

*Omitted from calculations for U. S. percentage losses.

BEAN

Estimated percentage reduction in yield of bean due to anthracnose (Colletotrichum lindemuthianum), bacterial blight (Bacterium phaseoli), mosaic, rootrots (Fusarium spp.) and other diseases, 1925. (Production figures not available)

State	Production 1925 Bushels (000 omitted)	Anthracnose %	Anthracnose Bushels (000 omitted)	Bacterial blight %	Bacterial blight Bushels (000 omitted)	Mosaic %	Mosaic Bushels (000 omitted)	Rootrots %	Rootrots Bushels (000 omitted)	Other diseases %	Other diseases Bushels (000 omitted)	Sum of traces and no data %	Sum of traces and no data Bushels (000 omitted)	All diseases %	All diseases Bushels (000 omitted)
Me.	112	5	6	0	0	t	+	1	1	-	-	1	1	7	8
N. H.		1	+	t	+	-	-	-	-	-	-	1	+	2	+
*Vt.	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mass.		0.5	+	t	+	t	+	1	+	1	+	2	+	4.5	+
Conn.		0.5	+	-	-	-	-	-	-	2	+	1	+	3.5	+
N. Y.	1,426	4	77	15	287	0.5	9	6	115	t	+	0	0	25.5	488
N. J.		1	+	-	-	t	+	-	-	-	-	2	+	3	+
Del.		t	+	t	+	t	+	-	-	t	+	1	+	1	+
Md.		1.5	+	1.5	+	t	+	t	+	t	+	1	+	4	+
Va.		1	+	3	+	t	+	1	+	t	+	-	-	5	+
W. Va.		1	+	t	+	t	+	2	+	t	+	0.5	+	3.5	+
S. C.		t	+	t	+	t	+	t	+	t	+	4	+	4	+
Ga.		t	+	t	+	t	+	2	+	7	+	1	+	10	+
Ohio		1.5	+	1	+	-	-	0.5	+	0	0	0	0	3	+
Ind.		-	-	5	+	3	+	-	-	-	-	1	+	9	+
Ill.		t	+	-	-	-	-	-	-	-	-	-	-	t	+
Mich.	8,289	t	+	4	356	1	89	t	+	1	89	1	89	7	623
Wis.	132	1	2	2	3	1	1	t	+	t	+	0.5	+	4.5	6

State	Production 1925 Bushels (000 omitted)	Estimated reduction in yield due to disease: Anthracnose %	Anthracnose Bushels (000 omitted)	Bacterial blight %	Bacterial blight Bushels (000 omitted)	Mosaic %	Mosaic Bushels (000 omitted)	Rootrots %	Rootrots Bushels (000 omitted)	Other diseases %	Other diseases Bushels (000 omitted)	Sum of traces and no data %	Sum of traces and no data Bushels (000 omitted)	All diseases %	All diseases Bushels (000 omitted)
Minn.	104	t	+	1	1	1	1	-	-	t	+	0.5	+	2.5	2
Iowa		t	+	5	+	5	+	-	-	-	-	0.5	+	10.5	+
N. Dak.		t	+	t	+	t	+	t	+	t	+	0.5	+	0.5	+
Kans.		t	+	-	-	t	+	t	+	-	-	0.5	+	0.5	+
Ala.		1.5	+	2	+	-	-	-	-	1	+	0	0	4.5	+
Miss.		1	+	1	+	-	-	-	-	-	-	1	+	3	+
La.		0.5	+	5	+	t	+	2.5	+	-	-	0	0	8	+
Texas		0	0	1	+	0	0	2	+	2	+	0	0	5	+
Ark.		t	+	t	+	t	+	-	-	2	+	0.5	+	2.5	+
Mont.	500	-	-	3	17	8	47	4	24	-	-	0	0	15	88
*Wyo.	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-
*Colo.	2,240	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N. Mex.	399	6	29	2	10	2	10	5	24	3	14	0	0	18	87
Ariz.	40	0	0	1	+	5	3	1	+	t	+	-	-	7	3
Utah		-	-	t	+	3	+	-	-	-	-	1	+	4	+
Idaho	1,584	0	0	t	+	4	68	3	51	0.5	9	0	0	7.5	128
Wash.		0	0	0	0	2	+	0	0	-	-	-	-	2	+
Calif.	4,080	-	-	-	-	3	136	3	136	4	181	0	0	10	453
U. S.	19,100 (16,666)	0.6	114	3.6	674	2	364	1.9	351	1.6	293	0.5	90	10.2	1,886

*Omitted from calculations for U. S. percentage losses.

Estimated reduction in yield of apple due to bitter rot (*Glomerella cingulata*), blackrot (*Physalospora cydoniae*), blotch (*Phyllosticta solitaria*), and cedar rust (*Gymnosporangium*), 1925.

State	Production: 1925 Bushels (000 omitted)	Estimated reduction in yield due to disease: Bitter rot %	Bitter rot Bushels (000 omitted)	Blackrot %	Blackrot Bushels (000 omitted)	Blotch %	Blotch Bushels (000 omitted)	Cedar rust %	Cedar rust Bushels (000 omitted)
Me.	3,305	0	0	t	+	0	0	t	+
N. H.	1,230	0	0	t	+	0	0	t	+
Vt.	935	0	0	t	+	0	0	t	+
Mass.	3,160	t	+	1	35	0	0	t	+
R. I.	299	t	+	1	3	0	0	t	+
Conn.	1,375	t	+	1	14	0	0	0.5	8
N. Y.	26,829	t	+	t	+	0	0	1	357
N. J.	2,845	t	+	t	+	0.75	22	t	+
Pa.	6,970	-	-	-	-	-	-	-	-
Del.	1,300	0.25	4	0.5	8	t	+	t	+
Md.	1,870	2	44	4	89	1	22	0.5	11
Va.	7,844	0.5	48	1.5	145	t	+	3	291
W. Va.	4,185	t	+	t	+	t	+	1	47
N. C.	3,192	3	115	2	76	3	114	1.5	57
S. C.	386	t	+	t	+	-	-	t	+
Ga.	741	1	8	3	23	0	0	0	0
Ohio	6,300	1	70	3	211	2	141	t	+
Ind.	2,700	0.1	2	0.5	14	1	29	t	+
Ill.	7,000	0.5	37	t	+	1	73	t	+
Mich.	9,000	0	0	1	103	0	0	t	+
Wis.	2,106	0	0	0	0	0	0	t	+
Minn.	940	0	0	t	+	0	0	0.5	5
Iowa	2,200	0	0	3	85	3	85	4	113
Mo.	4,100	-	-	-	-	-	-	t	+
S. Dak.	62	t	+	t	+	t	+	1	+
Nebr.	450	t	+	t	+	t	+	t	+
Kans.	1,600	t	+	t	+	4	75	0.5	9
Ky.	2,625	t	+	t	+	4	146	t	+
Tenn.	1,881	1	23	t	+	3	68	0.5	11
Ala.	595	1	7	0.5	4	10	74	t	+
Miss.	221	1	3	1	3	3	7	t	+
La.	28	t	+	t	+	-	-	-	-
Texas	264	0	0	t	+	2	6	-	-
Okla.	644	-	-	-	-	-	-	t	+
Ark.	4,070	t	+	t	+	1	43	0.5	22
Mont.	80	0	0	0	0	0	0	0	0
Wyo.	25	0	0	0	0	0	0	0	0
Colo.	3,200	0	0	t	+	0	0	0	0
N. Mex.	1,021	0	0	0	0	0	0	0	0
Ariz.	98	0	0	0	0	0	0	0	0
Utah	1,250	0	0	0	0	0	0	0	0
Nev.	74	0	0	0	0	0	0	0	0
Idaho	5,500	0	0	0	0	0	0	0	0
Wash.	28,700	0	0	0	0	0	0	0	0
Oregon	5,400	0	0	0	0	0	0	0	0
Calif.	6,016	0	0	t	+	0	0	0	0
U. S.	164,616	0.2	361	0.4	813	0.5	905	0.5	931

Estimated reduction in yield of apple due to fireblight (Bacillus amylovorus), scab (Venturia inaequalis), and other diseases, 1925.

State	Estimated reduction in yield due to disease									
	Fireblight		Scab		Other diseases		Sum of traces and no data		All diseases	
	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)	%	Bushels (000 omitted)
Me.	t	+	5	175	-	-	1	35	6	210
N. H.	t	+	2	25	2	25	1	14	5	64
Vt.	t	+	2	20	-	-	3	29	5	49
Mass.	1	35	5	176	3	105	0	0	9	351
R. I.	t	+	-	-	-	-	4	12	5	15
Conn.	0.25	3	2.5	37	0.75	10	0	0	5	72
N. Y.	7	2,503	10	3,580	7	2,503	0	0	25	8,943
N. J.	t	+	4	124	3	93	0.25	8	8	247
Pa.	-	-	-	-	-	-	-	-	-	-
Del.	t	+	5	76	8	119	0.25	4	14	211
Md.	4	89	2	44	2	44	0	0	15.5	343
Va.	t	+	4	387	10	968	0	0	19	1,839
W. Va.	t	+	2	94	6	282	2	94	11	517
N. C.	3	115	3	115	1	38	0	0	16.5	630
S. C.	1	4	t	+	-	-	4	16	5	20
Ga.	t	+	1	8	t	+	1	8	6	47
Ohio	2	141	0.5	35	2	141	0	0	10.5	739
Ind.	2	58	1	29	2	58	0.1	3	6.7	193
Ill.	2	148	0.5	37	1	73	0	0	5	368
Mich.	8	829	2	206	-	-	2	206	13	1,344
Wis.	4	93	5	118	t	+	1	23	10	234
Minn.	5	51	t	+	1	10	1	10	7.5	76
Iowa	5	142	2.5	71	5	142	0	0	22.5	638
Mo.	-	-	-	-	-	-	-	-	t	+
S. Dak.	3	2	3	2	2	1	1	1	10	6
Nebr.	5	25	1	5	-	-	2	9	8	39
Kans.	5	93	0.5	9	2	37	2	37	14	260
Ky.	8	292	10	364	6	218	0	0	28	1,020
Tenn.	0.5	11	10	226	-	-	2	46	17	385
Ala.	2.5	19	3	22	3	22	0	0	20	148
Miss.	5	12	-	-	-	-	1	2	11	27
La.	-	-	-	-	-	-	-	-	t	+
Texas	2	5	0	0	4	11	t	+	8	22
Okla.	-	-	-	-	-	-	10	71	10	71
Ark.	1	43	t	+	1	43	3	131	6.5	282
Mont.	t	+	-	-	3	3	1	+	4	3
Wyo.	t	+	-	-	2	+	1	+	3	+
Colo.	t	+	t	+	-	-	2	65	2	65
N. Mex.	3	44	2	29	25	364	0	0	30	437
Ariz.	-	-	-	-	-	-	-	-	-	-
Utah	-	-	-	-	0.5	6	0	0	0.5	6
Nev.	-	-	-	-	-	-	-	-	-	-
Idaho	t	+	t	+	6	354	1	59	7	413
Wash.	t	+	t	+	5	1,510	-	-	5	1,510
Oregon	1	57	2.5	143	-	-	2	114	5.5	314
Calif.	0.5	32	4	263	4	263	0	0	8.5	558
U. S.	2.6	4,846	3.4	6,420	4	7,443	0.5	997	12.1	22,716

PEACH

Estimated reduction in yield of peach due to leafcurl (<u>Exoascus deformans</u>), brownrot (<u>Sclerotinia fructicola</u>), yellows and little peach, scab (<u>Cladosporium carpophilum</u>), and other diseases, 1925.

State	Production 1925 Bushels (000 omitted)	Leafcurl %	Leafcurl Bushels (000 omitted)	Brownrot %	Brownrot Bushels (000 omitted)	Yellows and little peach %	Yellows and little peach Bushels (000 omitted)	Scab %	Scab Bushels (000 omitted)	Other diseases %	Other diseases Bushels (000 omitted)	Sum of traces and no data %	Sum of traces and no data Bushels (000 omitted)	All diseases %	All diseases Bushels (000 omitted)
Me.		t	+	0	0	0	0	0	0	t	-	-	-	t	+
N. H.	34	t	+	-	-	0	0	-	-	-	-	1	+	1	+
Mass.	218	2	5	1	2	t	+	t	+	1	2	0	0	4	9
R. I.	30	-	-	-	-	-	-	-	-	-	-	5	1	5	1
Conn.	210	-	-	4	9	1	2	0.75	2	0.25	+	0	0	6	13
N. Y.	1,920	t	+	2.5	51	t	+	t	+	1	20	1.5	30	5	101
N. J.	1,740	0.5	9	4	76	2	38	0.5	9	1	19	0	0	8	151
Pa.	600	-	-	-	-	-	-	-	-	1	6	-	-	1	6
Del.	155	1.5	2	1	2	0.25	+	1	2	1.5	2	0	0	5.25	8
Md.	240	3	8	7	19	2	6	1.5	4	t	+	0	0	13.5	37
Va.	362	0.5	2	2	7	t	+	0.5	2	1.5	6	0	0	4.5	17
W. Va.	100	t	+	t	+	t	+	t	+	1.5	1	2	2	3.5	3
N. C.	1,500	2	35	5	87	-	-	2	35	5	87	0	0	14	244
S. C.	740	2	17	10	88	-	-	-	-	3	26	0.5	4	15.5	135
Ga.	7,304	0	0	0.5	38	0	0	1.5	115	3	231	0	0	5	384
Fla.	115	0	0	-	-	-	-	1	1	-	-	-	-	1	1
Ohio	1,100	0.5	6	2	23	1	12	1	12	2	23	0	0	6.5	76
Ind.	380	-	-	1	4	-	-	-	-	1	4	2	7	4	15
Ill.	600	t	+	t	+	0	0	-	-	0.5	3	2	12	2.5	15
Mich.	592	1	6	5	32	0.5	3	t	+	t	+	0.5	3	7	44
Iowa	12	0	0	-	-	0	0	0	0	-	-	3	+	3	+

State	Production: 1925 Bushels (000 omitted)	Leafcurl %	Leafcurl Bushels (000 omitted)	Brownrot %	Brownrot Bushels (000 omitted)	Yellows and little peach %	Yellows and little peach Bushels (000 omitted)	Scab %	Scab Bushels (000 omitted)	Other diseases %	Other diseases Bushels (000 omitted)	Sum of traces and no data %	Sum of traces and no data Bushels (000 omitted)	All diseases %	All diseases Bushels (000 omitted)
Mo.	970	-	-	-	-	0	0	0	0	-	-	4	36	4	36
Nebr.	33	-	-	-	-	0	0	0	0	-	-	4	1	4	1
Kans.	371	3	11	1	4	0	0	t	+	1	4	-	-	5	19
Ky.	570	t	+	3	18	0	0	3	18	-	-	1	6	7	42
Tenn.	1,415	t	+	5	75	-	-	t	+	-	-	1	15	6	90
Ala.	1,312	t	+	1	14	-	-	1	14	4	55	0	0	6	83
Miss.	712	t	+	-	-	0	0	1	7	-	-	4	30	5	37
La.	275	-	-	-	-	0	0	-	-	-	-	10	30	10	30
Texas	1,750	1.5	28	1	19	0	0	1	19	4	75	0	0	7.5	141
Okla.	950	t	+	-	-	0	0	-	-	-	-	5	50	5	50
Ark.	2,200	t	+	5	119	0	0	1	24	2	48	0	0	8	191
Colo.	450	-	-	-	-	0	0	-	-	-	-	2	9	2	9
N. Mex.	156	1	2	3	5	0	0	-	-	2	3	4	7	10	17
Ariz.	65	-	-	-	-	0	0	-	-	-	-	-	-	-	-
Utah	110	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nev.	8	-	-	-	-	0	0	-	-	-	-	-	-	-	-
Idaho	23	t	+	0	0	-	-	0	0	1	+	0.5	+	1.5	+
Wash.	870	t	+	0	0	0	0	0	0	1	8	-	-	1	8
Oregon	222	2	4	t	+	0	0	0	0	5	12	0	0	7	16
Calif.	16,251	0.5	86	-	-	0	0	-	-	4	687	1	172	5.5	945
U. S.	46,565	0.5	221	1.4	692	0.1	61	0.5	264	2.7	1,322	0.8	415	6	2,975

PEAR

Estimated reduction in yield of pear due to fireblight (Bacillus amylovorus), scab (Venturia pyrina), leafblight (Fabraea maculata), and other diseases, 1925.

State	Production 1925 Bushels (000 omitted)	Estimated reduction in yield due to disease: Fireblight %	Fireblight Bushels (000 omitted)	Scab %	Scab Bushels (000 omitted)	Leafblight %	Leafblight Bushels (000 omitted)	Other diseases %	Other diseases Bushels (000 omitted)	Sum of traces and no data %	Sum of traces and no data Bushels (000 omitted)	All diseases %	All diseases Bushels (000 omitted)
Me.	13	t	+	t	+	0	0	-	-	1	1	1	1
N. H.	19	t	+	-	-	-	-	-	-	-	-	t	+
*Vt.	12	-	-	-	-	-	-	-	-	-	-	-	-
Mass.	90	1	1	1	1	t	+	t	+	0.2	+	2.2	2
R. I.	13	1	+	-	-	-	-	-	-	1	+	2	+
Conn.	60	0.5	+	1.5	1	0.5	+	0.5	+	0	0	3	1
N. Y.	3,045	20	771	t	+	t	+	1	38	0	0	21	809
N. J.	512	t	+	0.5	3	5	27	-	-	0.5	2	6	32
*Pa.	468	-	-	-	-	-	-	-	-	-	-	-	-
Del.	180	1.5	3	+	-	1	2	2	3	0	0	4.5	8
Md.	280	8	27	1	3	5	17	3	10	0	0	17	57
Va.	135	1	2	t	+	t	+	1	1	0.5	+	2.5	3
W. Va.	34	t	+	t	+	t	+	2	1	1	+	3	1
N. C.	158	18	34	-	-	-	-	-	-	-	-	18	34
S. C.	87	10	9	-	-	-	-	1	1	-	-	11	10
Ga.	155	25	55	t	+	0	0	5	11	t	+	30	66
*Fla.	54	-	-	-	-	-	-	-	-	-	-	-	-
Ohio	354	3	11	1	4	-	-	1	3	0	0	5	18
*Ind.	209	-	-	-	-	-	-	-	-	-	-	-	-
Ill.	510	10	57	-	-	t	+	t	+	1	6	11	63
Mich.	450	10	51	2	10	t	+	t	+	0.5	3	12.5	64
Wis.	15	t	+	t	+	0	0	t	+	1	+	1	+

State	Production 1925 Bushels (000 omitted)	Fireblight %	Fireblight Bushels (000 omitted)	Scab %	Scab Bushels (000 omitted)	Leafblight %	Leafblight Bushels (000 omitted)	Other diseases %	Other diseases Bushels (000 omitted)	Sum of traces and no data %	Sum of traces and no data Bushels (000 omitted)	All diseases %	All diseases Bushels (000 omitted)
Iowa	45	10	5	t	+	0	0	-	-	0.5	+	10.5	5
*Mo.	342	-	-	-	-	-	-	-	-	-	-	-	-
*Nebr.	18	-	-	-	-	-	-	-	-	-	-	-	-
Kans.	165	4	7	-	-	-	-	-	-	1	1	5	8
Ky.	85	15	15	t	+	t	+	-	-	0.5	+	15.5	15
Tenn.	148	15	26	-	-	t	+	-	-	1	2	16	28
Ala.	157	25	52	1	2	-	-	-	-	-	-	26	54
*Miss.	189	-	-	-	-	-	-	-	-	-	-	-	-
*La.	74	-	-	-	-	-	-	-	-	-	-	-	-
Texas	386	2	8	0	0	0	0	4	16	0	0	6	24
*Okla.	146	-	-	-	-	-	-	-	-	-	-	-	-
*Ark.	89	-	-	-	-	-	-	-	-	-	-	-	-
*Colo.	510	-	-	-	-	-	-	-	-	-	-	-	-
N. Mex.	56	13	9	-	-	-	-	5	3	0	0	18	12
*Ariz.	14	-	-	-	-	-	-	-	-	-	-	-	-
*Utah	30	-	-	-	-	-	-	-	-	-	-	-	-
*Nev.	7	-	-	-	-	-	-	-	-	-	-	-	-
Idaho	39	t	+	-	-	-	-	-	-	1	+	1	+
Wash.	2,300	t	+	0	0	0	0	2	46	-	-	2	46
Oregon	1,500	10	169	1	17	0	0	0.5	8	0	0	11.5	194
Calif.	6,667	16	1,333	4	333	-	-	-	-	0	0	20	1,666
U. S.	19,820	12.67	2,645	1.79	374	0.22	46	0.67	141	0.07	15	15.42	3,221

*= Omitted from calculations for U. S. percentage losses.

Estimated reduction in yield of grape due to blackrot (Guignardia bidwellii), and other diseases, 1925.

State	Production 1925 Tons	Blackrot %	Blackrot Tons	Other diseases %	Other diseases Tons	Sum of traces and no data %	Sum of traces and no data Tons	All diseases %	All diseases Tons
*Me.	48	-	-	-	-	-	-	-	-
*N. H.	95	-	-	-	-	-	-	-	-
*Vt.	49	-	-	-	-	-	-	-	-
Mass.	473	t	+	1	+	-	-	1	+
*R. I.	300	-	-	-	-	-	-	-	-
Conn.	1,063	0.5	5	2	22	0	0	2.5	27
N. Y.	51,840	t	+	1	523	-	-	1	523
*N. J.	2,200	-	-	-	-	-	-	-	-
*Pa.	11,180	-	-	-	-	-	-	-	-
Del.	1,275	3	40	0.5	6	0	0	3.5	46
Md.	781	10	90	3	26	0	0	13	116
Va.	1,653	7	125	1	18	0	0	8	143
W. Va.	760	1	8	1	7	0	0	2	15
N. C.	4,950	4	210	2	105	0	0	6	315
S. C.	1,078	5	58	2	23	0	0	7	81
Ga.	1,470	5	78	1	15	0	0	6	93
Ohio	13,750	0.5	69	-	-	-	-	0.5	69
*Ind.	2,450	-	-	-	-	-	-	-	-
Ill.	3,360	0.5	17	-	-	0.5	16	1	33
Mich.	22,100	0	0	4	920	0	0	4	920
Wis.	248	t	+	2	5	0	0	2	5
Minn.	30	0	0	-	-	-	-	-	-
Iowa	2,835	t	+	2	57	0	0	2	57
*Mo.	5,760	-	-	-	-	-	-	-	-
*Nebr.	770	-	-	-	-	-	-	-	-
Kans.	2,216	t	+	t	+	1	22	1	22
Ky.	972	8	84	-	-	-	-	8	84
Tenn.	1,278	5	69	2	27	-	-	7	96
Ala.	880	3	28	-	-	2	18	5	46
Miss.	285	5	15	-	-	1	3	6	18
*La.	42	-	-	-	-	-	-	-	-
Texas	940	5	52	5	52	0	0	10	104
*Okla.	1,750	-	-	-	-	-	-	-	-
Ark.	4,400	t	+	1	44	-	-	1	44
*Colo.	260	-	-	-	-	-	-	-	-
N. Mex.	475	2	10	3	15	0	0	5	25
*Ariz.	419	-	-	-	-	-	-	-	-
*Utah	675	-	-	-	-	-	-	-	-
*Nev.	180	-	-	-	-	-	-	-	-
Idaho	270	5	14	-	-	-	-	5	14
Wash.	3,100	-	-	-	-	5	163	5	163
Oregon	1,500	0	0	20	375	0	0	20	375
*Calif.	1,817,000	-	-	-	-	-	-	-	-
U. S.	1,967,160	0.8	972	1.7	2,240	0.2	222	2.7	3,434

* = Omitted from calculations for U. S. percentage losses.

PLUM AND PRUNE

Estimated reduction in yield of plum and prune due to brownrot (*Sclerotinia fructicola*), and other diseases, 1925.

State	Estimated reduction in yield due to disease			
	Brownrot	Other diseases	Sum of traces and no data	All diseases
	%	%	%	%
Me.	t	-	-	t
Mass.	2	2	0	4
R. I.	3	-	-	3
Conn.	5	1	0	6
N. Y.	7	t	-	7
N. J.	5	-	-	5
Del.	0.5	.3	0	3.5
Md.	7	1	-	8
Va.	t	-	-	t
W. Va.	1	1	0	2
Ga.	1	0	0	1
Ohio	10	2	0	12
Ill.	-	t	-	t
Mich.	5	t	0	5
Wis.	8	t	0	8
Minn.	t	t	-	t
N. Dak.	t	t	-	t
S. Dak.	-	2	0	2
Kans.	1	-	-	1
Ky.	4	2	0	6
Tenn.	5	1	-	6
Texas	0.5	2	0	2.5
Ark.	t	-	1	1
N. Mex.	2	6	0	8
Idaho	0	2	0	2
Wash.	t	2	-	2
Oregon	10	1	0	11
Calif.	t	-	-	t

CHERRY

Estimated reduction in yield of cherry due to brownrot (Sclerotinia fructicola), leafspot (Coccomyces hiemalis), and other diseases, 1925.

State	Estimated reduction in yield due to disease				
	Brownrot	Leafspot	Other diseases	Sum of traces and no data	All diseases
	%	%	%	%	%
Me.	t	-	0	-	t
Mass.	1	t	t	-	1
Conn.	3	-	2	-	5
N. Y.	1.5	0.5	t	0	2
N. J.	4	0.5	t	0	4.5
Del.	0.25	t	1.25	0	1.5
Md.	10	10	-	0	20
Va.	2	1	t	0.5	3.5
W. Va.	t	t	t	1	1
S. C.	2	-	-	1	3
Ohio	1	0.5	1	0	2.5
Ill.	1	0.5	t	0.5	2
Mich.	5	5	1	0	11
Wis.	0.5	0.5	1	0	2
Iowa	t	5	5	0.5	10.5
Kans.	t	1	-	-	1
Ky.	t	2	-	0	2
Tenn.	t	1	-	0.5	1.5
Ark.	2	t	1	0.3	3.3
N. Mex.	2	-	12	0	14
Utah	-	-	6	-	6
Idaho	0	0	1	0	1
Wash.	t	0	2	-	2
Oregon	3	0.5	0.5	0	4
Calif.	10	-	-	-	10

RASPBERRY

Estimated reduction in yield of raspberry due to mosaic and leafcurl (cause unknown), and other diseases, 1925.

State	Estimated reduction in yield due to disease			
	Mosaic and Leafcurl	Other diseases	Sum of traces and no data	All diseases
	%	%	%	%
Me.	5	2	0	7
Mass.	20	2	0	22
Conn.	4	2	0	6
N. Y.	17	17	0	34
Del.	0.5	0.5	0	1
Md.	5	7	0	12
Va.	-	7	-	7
W. Va.	-	3	-	3
Ind.	0.1	8	0	8.1
Mich.	15	10	0	25
Wis.	10	5	0	15
Minn.	15	7	0	22
Iowa	8	17	0	25
N. Dak.	2	2.5	0	4.5
S. Dak.	2	2	0	4
Kans.	t	10	-	10
Tenn.	0	1	-	1
Texas	5	5	0	10
Ark.	0	25	0	25
N. Mex.	2	2	0	4
Utah	-	18	0	18
Idaho	5	5	0	10
Wash.	2	10	-	12
Oregon	1	5	0	6

THE PLANT DISEASE REPORTER

Issued By

The Office of Mycology and Disease Survey

Supplement 50

Diseases of Forest and Shade Trees, Ornamental and Miscellaneous Plants in the United States in 1925.

December 1, 1926

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

PLANT DISEASE SURVEY

1925

List of collaborators of the Plant Disease Survey who have made the principal contribution to this section of the 1925 annual summary on plant diseases.

Alabama	Walter L. Blain
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Delaware	J. F. Adams
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	L. S. Seal
	Erdman West
Georgia	O. C. Boyd
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New Hampshire	O. R. Butler
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New York	Charles Chupp
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North Carolina	H. M. Curran
Ohio	C. May
Oregon	H. P. Barss
Pennsylvania	R. S. Kirby
	W. A. McCubbin
Porto Rico	Mel T. Cook
	C. M. Tucker
South Carolina	L. M. Fenner
	C. A. Ludwig
South Dakota	A. T. Evans
Texas	J. J. Taubenhaus
Utah	B. L. Richards
Virginia	F. P. McWhorter
	S. A. Wingard
Washington	Dept. Plant Path.
	Geo. L. Zundel
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	S. B. Fracker
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DISEASES OF FOREST AND SHADE TREES, ORNAMENTAL AND MISCELLANEOUS PLANTS IN THE UNITED STATES IN 1925

Plant Disease Reporter
Supplement 50

December 1, 1926

Prepared by
G. Hamilton Martin

CONTENTS

FOREWORD

This summary of the diseases of forest and shade trees, ornamental and miscellaneous plants in the United States in 1925 follows the same general plan as those of the preceding years. The sources upon which the information is based are as follows: (1) collaborators, (2) specialists in the Office of Forest Pathology, (3) articles in botanical journals, and (4) special reporters.

Many reports of new occurrences were received for 1925 both for individual states and for the United States. In the accompanying summary these first occurrences have been noted by symbols before each individual report. Many occurrences are given which have been obtained from literature, from the Mycological herbarium of the Bureau of Plant Industry, or from past records of the Plant Disease Survey. Quite a number of diseases have been omitted due to their unimportance or to the fact that they have been reported in other years. It is not the object of this summary to enumerate all of the diseases that have been reported during the year, but to give facts concerning only some of the more important ones. "Standardized Plant Names" (American Joint Committee on Horticultural Nomenclature. Standardized Plant Names, 1-543. Salem, Mass. 1923) has been used as the source for the names of the hosts.

Where specimens are not indicated the report is based on the authority of the person cited. The date given is that of its earliest reported appearance in 1925. Reports of diseases from British Columbia are given because of their possible occurrence also in Washington and Idaho.

The following symbols are used: * indicates a specimen in the Mycological herbarium; + preceding disease indicates the first report of the disease to the Plant Disease Survey; + preceding state indicates the first report from the state to the Plant Disease Survey; P.r. indicates prior reports of the disease to the Plant Disease Survey.

References have been given and in some instances brief abstracts made of recent articles which may be of service to those who do not have access to all botanical journals. A list of collaborators is given on the first page. The names of the special reporters are as follows:

Boyce, J. S.	Foster, A. C.	Marshall, R. P.
Brierley, Philip	Gravatt, G. F.	Martin, J. F.
Conard, H. S.	Hahn, G. G.	Orton, C. R.
Collins, J. Franklin	Hartley, Carl	Waite, M. B.
Craighead, F. C.	Haskell, R. J.	Waterman, Alma
Drechsler, Charles	Jenkins, Anna E.	Weiss, Freeman

EFFECT OF DROUTH ON TREES AND SHRUBS IN 1925

The year 1925 was one of the driest in the history of the U. S. Weather Bureau. An outline of the seasonal weather conditions has already been given in this series of publications (Pl. Dis. Reptr. 45: I and II, 47: 173-179, 48: 303.) The drouth was of unprecedented severity in the southern Appalachian region where wells dried up and trees and plants of many kinds lost their foliage and in many cases died. The following notes by Hartley and Craighead give some detail of the situation.

> The drouth in parts of the Appalachians caused leaf death or shedding on many broad-leaved forest trees, and is said to have resulted in Dendroctonus beetle attack on pines. The real extent of the damage cannot be judged in most cases until the trees leaf out again. (C. Hartley)

> A hardwood area on a north slope just opposite Bent Creek, North Carolina, is seriously affected by drouth. Much of the foliage has turned brown as in late fall and with some species it is entirely shed. Chestnut oak, chestnut, and white oak are most seriously affected, especially fire scarred and hollow trees. One of the black oaks, probably red oak, seemed more resistant, hickory most resistant. The under story of shrubby plants appears to be even more affected than the trees. Dogwood, sour wood, huckleberry, laurel, maple, and rhododendron all showed various degrees of leaf cast or browning in about the order named. The herbaceous growth and the ferns are also quite dry. At places where evidently a trickle of water occurred in normal seasons the alder had completely died and the wood was brown and dry. There is no possibility of these alders recovering. The worst injury seems to occur along the rock out-crops or where the soil is extremely thin. Many other such examples occur in surrounding country. (F. C. Craighead, Sept. 14)

WINTER KILLING OF TREES IN THE NORTHWEST

On my trip East I was amazed at the severity and extent of winter injury on conifers in northern Idaho and western Montana. The injury was apparent along the line of the Great Northern from Spokane, Washington, to the eastern edge of Glacier Park in Montana, a distance of 355 miles. How much farther east it extended I cannot say, because it became too dark to see.

The injury is most severe from just west of Bonner's Ferry, Idaho, to east of Columbia Falls, Montana.

Trees of all ages and sizes from seedlings to veterans are affected. Many of them seem to be in apparently protected situations at the bottoms of draws. Many trees were completely browned, but on those which are only partially damaged the younger needles were the most severely injured. Furthermore, the east side of the partially injured trees was most affected.

Western yellow pine was most severely injured, followed rather closely by western white pine and lodgepole pine. Western red cedar was next in susceptibility, while white fir, alpine fir, Douglas fir, and Engelmann spruce were practically free from any injury except for the slight reddening of the needles on an occasional tree.

Winter injury was widespread over eastern Oregon, eastern Washington, the entire timbered portion of Idaho, and the western half of Montana. It was most striking and catastrophic in appearance. It is the worst and most intensive that has come under my observation for the past 13 years. (J. S. Boyce, May 14)

Winter killing in the Bitterroot Valley

The extensive destruction of many species of plants throughout much of Idaho, western Montana, eastern Oregon, and Washington, as a result of the severe December freeze is very pronounced on yellow pine in the Bitterroot Valley. At this time the foliage is decidedly yellow or brown and presents a very characteristic appearance to the valley floor and surrounding hillsides. Among the conifers only yellow pine is affected in this vicinity, the injury extending to an elevation of 5500 feet, being quite light above 5000 feet. It is recorded by forest officers that in other regions Douglas fir, spruce, and many deciduous shrubs were severely injured. Many orchards in the valley were almost completely killed, particularly poor trees.

The most conspicuous feature is the extreme erraticalness of the injury. Below 5000 feet elevation approximately 85 per cent of the yellow pine is more or less affected. In some cases extensive groups may be injured or again only a few trees within a clump or even single trees scattered here and there in the forest. The injury apparently bears no relation to rate of growth, situation, or exposure though at the bottoms of the deeper canyons there is apparently less injury.

This suggests an explanation based on the fact that the extremely warm weather preceding the fall of temperature activated certain individuals more than others and those that most readily responded were most seriously injured by the freeze. Observations on the opening of the buds in the spring of the year clearly show that all individuals do not respond alike. In the deeper canyons where the sunlight did not reach the trees, except for a few hours of the day, there would obviously be less response. This would also explain the severe injury to pear trees which start growth early in the spring.

Reproduction on the whole suffered more seriously than mature trees. It is quite likely that about 50 per cent of the trees had practically all the needles killed, resulting in complete defoliation. Some of these trees did not open the buds this spring and are now completely dead and infested with Ips. Possibly one per cent of the trees are in this condition. Others developed new growth on some buds which withered either before or after full development of the needles. Most of the trees put out new growth on at least 50 per cent of the terminal buds. In a few cases, practically all the buds have developed even though all the old needles were killed. A number of trees that were examined showed practically no annual layer of wood except for a very narrow band of spring wood which possibly might have been formed during the few warm days preceding the freeze. The new growth developing from the terminal buds, particularly those trees in which only 50 per cent or less of the buds have developed, has an unhealthy appearance. The foliage is lighter in color and the phloem is brown in spots. It is possible that many of these trees will die; in fact it would not surprise me if the total mortality within the next two or three years will exceed 25 per cent.

At this time detailed records of the change in temperature were not obtained but at Missoula, the nearest weather station, it is reported that on December 14 temperatures above 60 degrees were obtained late that afternoon and during the following night the thermometer dropped to 20 degrees below. (F. C. Craighead, July 24-26)

CEDAR BLIGHT CAUSED BY PHOMOPSIS JUNIPEROVORA IN 1925

By Glenn Gardner Hahn

Because of the particularly dry season cedar blight (Phomopsis juniperovora), which was so destructive in coniferous seedling beds in 1924, was very much reduced in the amount of damage which it produced in most localities in 1925. Several large nurseries which had suffered serious loss in the first named year experienced a loss in 1925 which was practicably negligible. Other nurseries still continued to experience loss.

The distribution of typical Phomopsis juniperovora, which occurs on species of Juniperus, Cupressus, Thuja, and Chamaecyparis (Retinospora), has been extended since the report of the fungus in 1924, (Pl. Dis. Reptr. Suppl. 42: 316-319. Sept. 15, 1925) to include California, Connecticut, and Wisconsin. Strains of Phomopsis closely resembling P. juniperovora, regarded tentatively as strains of the latter fungus but for the sake of clearness kept separate until a definite determination can be made, are reported also from California and Washington.

Additional generic hosts, occurring naturally for strains of Phomopsis closely resembling ~~Phomopsis~~ juniperovora, other than Cephalotaxus, Taxus, Taxodium, Cryptomeria, and Pseudotsuga have been found. These include Sequoia, Tsuga, Abies, Larix, and Thujopsis.

~~Symptoms~~ of disease caused by Phomopsis juniperovora are identical with those caused by the closely related Phomopsis strains. In both cases a typical blight and canker occur.

Diagnoses of the disease have been made from specimens of Phomopsis juniperovora and the closely related Phomopsis strains ~~on certain~~ of the genera listed above from the following states:

Connecticut: Cromwell, December 17, 1925. Large numbers of two-year old plants of Juniperus virginiana (grown from seed) reported affected on all types of soil. Collections made by Donald Ross and submitted by Prof. Orton L. Clark, Amherst, Mass.

District of Columbia: Department of Agriculture Grounds, July 31, 1925. Terminals and laterals of ornamental Tsuga canadensis. Collections made by G. G. Hahn.

California: Golden Gate Park, San Francisco, November 1925. Terminals and laterals of branches of Sequoia sempervirens; twig blight of Abies homolepis, (A. brachyphylla, Nikko fir); blight and canker of Cupressus funebris; twig blight of Juniperus procumbens; blight and canker of Sequoia washingtoniana; blight and canker of Thujopsis dolobrata, (Hiba arbor-vitae). Collections made by Eric Walther and G. G. Hahn.

Niles, November, 1925. Terminals and laterals of ornamental Douglas fir, Pseudotsuga taxifolia, Pacific Coast type. Collection made by G. G. Hahn.

Illinois: Dundee, September 21, 1925. Cedar blight heavy in the two-year old red cedar beds (Juniperus virginiana) due to the heavy infection present in the beds the year before.

Missouri: St. Joseph. Infected Juniperus virginiana. The wet season of 1925 produced more blight than usual, much of it in fine specimen trees 8 to 10 feet high. Serious in seed beds. Collections made July 14, 1925.

New York: Peekskill, August 20, 1925. One-year old seedlings of Cephalotaxus drupacea, (Japanese yew) affected. Collections made by L. L. Lundquist.

Ohio: Wooster, Ohio Agricultural Experiment Station, Larix leptolepis, (Japanese larch). Dying in the station nursery reported July 11, 1917, by D. C. Babcock. Specimen of fungus determined as Phoma by Dr. A. S. Rhoads. Determined as Phomopsis by G. G. Hahn, January 26, 1926.

Pennsylvania: Lancaster, August, 1925. Twig blight of 15-year old trees of Douglas fir, Pseudotsuga taxifolia, Rocky Mountain type, in an ornamental plantation. Infection slight. Collection made by R. P. Marshall and E. D. Ruth.

September 3, 1925. Twig blight of P. taxifolia, Rocky Mountain type, and Larix europaea. Collections made by G. G. Hahn, Reading.

January 23, 1926. Blight of rooted cuttings of Taxus cuspidata. Collections made by W. J. Henning.

Washington: Stabler, October 15, 1925. Seedling blight of low altitude and high altitude one-year old Douglas fir, Pseudotsuga taxifolia, Pacific Coast type. Collections made by W. F. Will and G. G. Hahn.

Wisconsin: Oconomowoc, July 30, 1925. Blight of native trees of Juniperus virginiana. Collections made by R. H. Colley.

Reports of the distribution of the Phomopsis juniperovora and closely related strains prior to 1925 include the following states: Alabama, District of Columbia, Florida, Illinois, Iowa, Kansas, Kentucky, Maryland, Minnesota, Missouri, Nebraska, New York, North Carolina, Ohio, Pennsylvania, and Tennessee.

Specimens of diseased nursery stock and ornamentals will be greatly appreciated for diagnosis in order to further determine the extent of the disease and its seriousness in different parts of the United States. To date 35 coniferous species representing 14 genera are known to be affected with Phomopsis. Our knowledge of the extent of the damage due to cedar blight in nurseries and ornamental plantings has in the past been somewhat confused due to the fact that disease caused by Phomopsis has been formerly attributed to frost, heat, drought, or transplanting injury.

WHITE PINE BLISTER RUST IN THE MIDDLE ATLANTIC AND LAKE STATES

By J. F. Martin

The blister rust situation in the Middle Atlantic and Lake States differs materially from that in New England and New York. The southward advance of the disease into northern New Jersey and northeastern Pennsylvania has been comparatively slow. Wild Ribes are moderately abundant but the pine host is so scattered that field conditions are unfavorable for rapid local spread. Cooperative scouting in New Jersey during 1925 resulted in the finding of infected cultivated black currants in Monmouth, Passaic, Warren, and Sussex Counties. Similar scouting in Pennsylvania showed the rust present in Wayne County at Callicoon, Rileyville, and Damascus where it had occurred in former years and at Laurella, a new location. In two instances the disease was on cultivated black currants, in the third it was on pines and black currants and in the fourth on pines and wild gooseberries.

In the Lake States the rust has spread somewhat faster than it has to the south, but here again the scattered occurrence of white pine interspersed with large areas of agricultural land, has not favored rapid spread. Cooperative scouting in Michigan during 1925 gave negative results. In Wisconsin scouting showed the disease present in several of the old infection centers. It is now present in six counties in the state.

In Minnesota, pine infection was found in nearly all previously reported areas, as well as in many new ones. A large center of infection on pine and Ribes was discovered at Duluth where 54 out of 181 plantings of cultivated black currants were found diseased. The rust was found on Ribes at Cloquet and on pine at Two Harbors, about 25 miles north of Duluth. The pine infections were the first found in that part of the state. The rust was located on Ribes as far west as Morrison County. Ribes hudsonianum was found diseased at Duluth and this appears to be the first record of infection for this species in this country.

WHITE PINE BLISTER RUST IN THE WEST

By G. B. Posey

The season of 1924 showed practically no extension of the known distribution of the rust in the West. The summer season was dry and hot, with very little rain and these conditions were unfavorable for the spread of the rust. In many cases, localities and even actual Ribes bushes known to have harbored the disease in 1923 were found to be free from it in 1924. For this reason, the known distribution of the rust at the close of the 1924 season was practically identical with that at the end of 1923.

During 1925 two important developments in the spread of the rust were noted. First, western white pines were found to be infected at Nelson, British Columbia. This pine infection resulted from Ribes infection found at that point in 1923, and is significant in that it constitutes a focus from which Ribes infecting spores can be disseminated over long distances, thus greatly increasing the chance for initial infection of Ribes in northern Idaho. In March 1926, three additional pine infection centers were found on Kootenay Lake, near Procter and Crawfords Bay, British Columbia. Second, the disease was found on Ribes in the coast region of northwestern Oregon at Pacific City, Wheeler, and Knappa. This spread undoubtedly denotes the presence of infected pines in the Puget Sound region of Washington some distance south of the Canadian border. It constitutes a direct thrust of the disease toward the sugar pine regions of southwestern Oregon and California.

CHESTNUT BLIGHT (ENDOTHIA PARASITICA (MURR.) AND.)

By G. F. Gravatt and R. P. Marshall

Chestnut blight inspection by members of the Office of Forest Pathology was less extensive in 1925 than in 1924. A number of new counties in Kentucky and Ohio were covered by C. J. Humphrey; parts of Ohio and Tennessee which had not been visited in 1924 were inspected by P. V. Siggers and J. W. Deyton; other points in the Southern Appalachians were inspected in the course of other work by D. V. Baxter, R. B. Clapper, G. G. Hedgcock and the writers; the condition of chestnut in New England has been reported by J. F. Collins, J. R. Hansborough, and P. Spaulding.

Collaborators including numerous government and state officials and private parties have given many valuable notes on the prevalence of the blight in their respective localities. Their observations have been combined with those of the members of this office in the accompanying 1925 chestnut blight distribution map. (Figure 5.)

Table 93 shows the amount of blight now believed present in two hundred counties in the principal chestnut region of the Southern Appalachians. To the right of this table is appended the totals of a similar summary made in 1924 for these same counties. Upon comparing the 1924 and 1925 totals the increase in severity of the blight in the Southern Appalachians during the past year is evident. The past season's survey also indicates that the blight is spreading rapidly through the chestnut stands of Ohio.

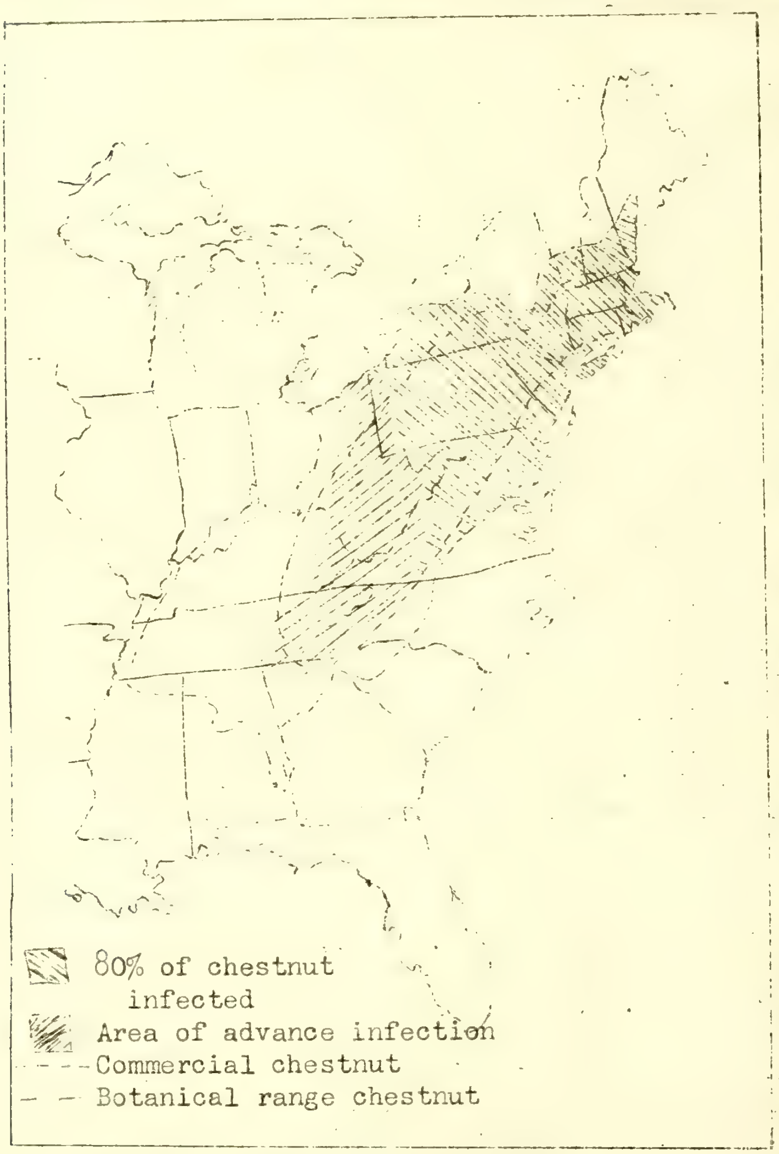

Fig. 5. Chestnut blight 1925.

Reports from New England and northern New York indicate that the remaining chestnut growth on the outskirts of the northern range of the species has now passed into the heavily infected stage. This spread in a region where the distribution of the chestnut is scattering illustrates the ability of the causal fungus to disseminate itself long distances over areas where its host does not occur.

Charles Chupp states that it is difficult to find a chestnut tree in New York which is not affected with blight. Much the same condition is true for certain areas in Virginia and North Carolina. G. W. Fant reports the blight in the foothills near Statesville, North Carolina, at an altitude of about 1,000 feet.

A brief survey to locate blight resistant chestnut trees was made in parts of eastern Pennsylvania, New Jersey, and Maryland. Some exotic chestnuts observed were quite resistant to the blight. Native chestnut trees varied in their blight susceptibility, but none which exhibited a high degree of blight resistance were observed. It is planned to continue this survey in the spring of 1926. Grafts are being made from the most promising trees located. These will be subjected to further tests of blight resistance.

Table 93. Summary of the 1925 chestnut blight survey for 200 counties in the Southern Appalachians. Totals for these same counties in 1924 are appended for comparison.

Degree of infection	Ga.	Ky.	N.C.	S.C.	Tenn.	Va.	W.Va.	Totals	1924 Totals
	Number of counties inspected								
None	3	8	0	0	1	0	0	12	33
Less than 1%	3	14	0	0	14	5	4	40	63
1-9%	4	0	11	1	15	6	14	51	25
10-29%	3	0	5	0	1	4	20	33	27
30-79%	2	0	7	2	1	6	8	26	18
80-100%	0	0	1	1	0	27	9	38	34
Totals	15	22	24	4	32	48	55	200	200

DISEASES OF CONIFERS

CEDAR, CALIFORNIA INCENSE (Libocedrus decurrens)
Phoradendron libocedri Howell, mistletoe.
California - (Wagener, W. W. Mistletoe in the lower bole of incense cedar. Phytopath. 15: 614-616. Oct. 1925.)

CEDAR, RED - See Redcedar

CEDAR (Thuja plicata?)
Cetraria lacunosa Ach. var. acharii Dr.
+Washington - Thurlow Island; British Columbia, Alert Bay. (Du Rietz, Bot. Not. 1925: 9-10. 1925.)

CHAMAECYPARIS SP.
Gymnosporangium spp.
Rhode Island - Mass. (Collins). P.r.: Ala., Conn., *Del., Fla., *Mass., *N. J., *Oreg., *Pa., *R. I., *Wash.

CYPRESS, COMMON BALD (Taxodium distichum)
+Polystictus versicolor (L.) Fr. (Polyporus versicolor L.), woodrot.
Florida - Chiefland, Levy Co., June 21. (West)

FIR, BALSAM (Abies balsamea)
Melampsorella elatina (Alb. & Schw.) Arth., rust witches'-broom.
+District of Columbia - (Collins)
Poria subacida Pk., feather rot, and Stereum sanguinolentum (Alb. & Schw.) Fr., red heart rot.
McCallum, A. W. A study of decay in balsam fir. (Abstract) Phytopath. 15: 302. 1925. Reports two above fungi from Quebec, Canada.

FIR, SILVER (Abies pectinata)

Rehmiellopsis bohemica Bubak. (Phoma bohemica Bubak. & Kabat)

Scotland - on A. pectinata, A. nobilis, A. pinsapo, A. pindrow, A. cephalonica.

Wilson, Malcolm. A new disease of the silver fir in Scotland. Trans. Royal Scottish Arbor. Soc. 38: 114-118. Oct. 1924.

JUNIPER, JAPANESE (Juniperus japonica)

+Bacterium tumefaciens EFS. & Town., crowngall.

Florida - rooted cuttings showed characteristic galls although the organism was not isolated. (West)

JUNIPER, COLORADO (Juniperus scopulorum)

Gymnosporangium nelsoni Arth.

*Wyoming - Yellowstone Park, August 20. (Conard). P.r.: Colo., Mont., N. Dak., *Utah, *Wyo.

JUNIPER (Juniperus sp.)

Sunscorch

Connecticut - Yalesville, August 19. (Clinton)

PINE, JACK (Pinus banksiana, (P. divaricata)

Cronartium comptoniae Arth., rust.

Minnesota - doing some damage in Carleton Co. (Div. Plant Path.)

P.r.: Conn., Minn., Wis.

PINE, SLASH (Pinus caribaea)

Cronartium strobilinum (Arth.) Hedgc. & Hahn, rust.

Florida - of widespread and frequent occurrence throughout a large part of the state and an extremely conspicuous disease when the cones are fruiting in late April and early May. In 1925 rusted pine cones were observed on longleaf pine (<u>Pinus palustris</u>) at Gainesville, Micanopy, and in the vicinity of DeLeon Springs and DeLand; and on slash pine (<u>Pinus caribaea</u>) at Gotha, Okeechobee City, Oslo, Melbourne, Eau Gallie, Rockledge, Cocoa, Merritt, Titusville, and LaGrange, thus indicating a wide distribution through the central part of the Peninsula and the East Coast. The distribution of this rust is much greater than the above mentioned localities would indicate. This rust is so abundant in some localities that the majority of the cones on many trees become rusted and aborted. This disease is quite obviously an extremely important factor in diminishing the reproduction of the host trees. (Rhoads).

P.r.: *Fla.

PINE, SAND (Pinus clausa)

+Cronartium cerebrum (Pk.) Hedgc. & Long, rust.

Florida - City Point and Orange City, July 1. (West & Rhoads)

Witches'-broom - cause unknown

Florida - observed at Georgiana on Merritts Island. (Rhoads)

PINE, NUT (Pinus edulis)

Coleosporium ribicola (Cke. & Ell.) Arth.

New Mexico - in northern part of state; Taos Co., September. (Crawford)

P.r.: *Colo., N. Mex.

PINE, HIMALAYAN (Pinus excelsa)

+Winter injury

Connecticut - the bark and wood at base of tree usually killed; trees appeared alright but died suddenly in early July; several reports; first reported from New Haven, July 8. (Clinton)

PINE, LONGLEAF (Pinus palustris)

Cronartium strobilinum (Arth.) Hedgc. & Hahn, rust

Florida - see Pinus caribaea on preceding page

+Lightning injury

Florida - Bithlo and Gainesville. (Rhoads)

+Leaf drop

Delaware - very severe in light soils. (Adams)

PINE, WESTERN YELLOW (Pinus ponderosa)

Cronartium harknessii (Moore) Meinecke, rust.

Gill, L. S. Peridermium harknessi (Moore) E. P. Meinecke in western yellow pine tops. Phytopath. 15: 617. Oct. 1925. Occurrence reported in Stanislans National Forest, California.

P.r.: Calif., Idaho, Wash.

Polyporus schweinitzii Fr., red-brown butt-rot.

Gill, L. S. Notes on sporophores of Polyporus schweinitzii Fr. on yellow pine in California. Phytopath. 15: 492-493. Aug. 1925.

P.r.: Mont.

Razoumofskya campylopoda (Engelm.) Piper, and R. cryptopoda (Engelm.) Coville, mistletoe

Korstian, C. F. Coincidence between the ranges of forms of western yellow pine, bark beetles and mistletoe. Science n.s. 61: 448. 1925.

PINE, RED (Pinus resinosa)

+Diplodia pinea Kick.

District of Columbia - (Collins)

+Phytophthora pini Leonian

Minnesota - Leonian, L. H. Physiological studies on the genus Phytophthora. Amer. Jour. Bot. 12: 444-498. July 1925.

PINE, WHITE (Pinus strobus)

Cronartium ribicola Fisch., blister rust.

See notes by J. F. Martin and G. B. Posey, pages 418-419.

References:

Colley, R. H. A biometric comparison of the urediniospores of Cronartium ribicola and Cronartium occidentale. Jour. Agr. Res. 30: 283-291. 1925.

Collingwood, G. H. Farm forestry extension in relation to the control of white pine blister rust. Proc. Ann. Blister Rust Conf. 10: 137-143. 1925.

Darrow, G. M. and S. B. Detwiler. Currants and gooseberries spread rust. Better Fruit 19 (11): 9, 20-21. 1925.

Darrow, G. M. and S. B. Detwiler. Currants and gooseberries spread rust. Better Fruit 19 (10): 10, 15-18. Apr. 1925.
Davidson, A. T. Blister rust activities in British Columbia. Rep. Proc. West. White Pine Blister Rust Conf. 5: 9-11. Dec. 1924.
Detwiler, S. B. Blister rust in the west and its significance. Rep. Proc. West. White Pine Blister Rust Conf. 5: 19-22. Dec. 1924.
Hahn, G. G. Methods of identifying blister rust by inoculating Ribes in the greenhouse. Proc. Ann. Blister Rust Conf. 10: 70-71. 1925.
Martin, J. F. White pine is profitable if protected from blister rust. U. S. Dept. Agr. Misc. Circ. 40. July 1925.
Pennington, L. H. Relation of weather conditions to the spread of white pine blister rust in the Pacific Northwest. Jour. Agr. Res. 30: 593-607. 1925.
Snell, W. H. and A. Rathbun-Gravatt. Inoculation of Pinus strobus trees with sporidia of Cronartium ribicola. Phytopath. 15: 584-590. Oct. 1925.
Spaulding, P. A partial explanation of the relative susceptibility of the white pines to the white pine blister rust (Cronartium ribicola Fischer). Phytopath. 15: 591-597. Oct. 1925.
____________ Longevity of blister rust teliospores and sporidia. Proc. Ann. Blister Rust Conf. 10: 72-73. 1925.
____________ and A. Rathbun-Gravatt. Conditions antecedent to the infection of white pines by Cronartium ribicola in the northeast United States. Phytopath. 15: 573-583. Oct. 1925.

PINE (Pinus sp.)

Cronartium strobilinum (Arth.) Hedgc. & Hahn, rust.

Florida - this was erroneously reported as Coleosporium delicatulum in the Plant Disease Reporter Supplement 42: 324. Sept. 15, 1924.

Damping off (undet.)

Wisconsin - good control obtained with sulfuric acid at Trout Lake Nursery; so far less successful on heavier soil at Sturgeon Bay. (Fracker)

Leaf scorch

New York - common; statewide in range; Warren Co., July 31. (Chupp)

REDCEDAR (Juniperus virginiana)

Phomopsis juniperovora Hahn, nursery blight, see pages 416-418.

REDWOOD (Sequoia sempervirens)

+Pestalozzia sp.

Florida - Tallahassee, Leon Co., August 2. (West)

RETINOSPORA, PLUME (Chamaecyparis pisifera plumosa)

+Sphaeropsis juniperi Pk.

Florida - Pasadena, Hillsborough Co., July 22. (West)

SPRUCE, BLACK (Picea mariana)

Melampsoropsis cassandrae (Pk. & Clint.) Arth., and M. ledicola (Pk.) Arth., leaf blister rust.

Minnesota - fairly prevalent throughout state; in some cases 50 per cent of a tree may be defoliated. (Div. Plant Path.)

+Wisconsin - M. ledicola reported from Ladysmith swamp area, July 15. (Fracker)

Razoumofskya pusilla (Pk.) Kuntze, witches'-broom.
Michigan - White Cloud, most southern location reported for Michigan. (Nelson)

SPRUCE (Picea sp.)
Spray injury
Connecticut - serious injury to tops of seedlings, which were just starting to grow, by spraying in the sunshine; Cheshire, July 13. (Stoddard)

DISEASES OF HARDWOODS

ALDER (Alnus sp.)
+Physalospora malorum (Pk.) Shear
South Carolina - Society Hill and Aiken, May and June. (Mycol. 17: 99. 1925.)

ASH, WHITE (Fraxinus americana)
+Cylindrosporium fraxinicolum Dearn. & House
New York - Bolton, Warren Co. (Dearness & House, New York St. Mus. Bull. 266: 92. June 1925)
Phyllosticta viridis Ell. & Kell., leafspot.
+Florida - common, not serious; Gainesville, Alachua Co., June 17. (West)
P.r.; Conn., Ill., Minn., N. Y., Va.

ASH, ARIZONA (Fraxinus velutina)
*+Heterodera radicicola (Greef) Muell., (Caconema radicicola (Greef) Cobb), rootknot.
Arizona - on nursery seedlings; no evidence of infestation until seedlings were dug for shipping; soil is a typical river silt; Phoenix, Maricopa County, March 31, 1926. (George) This seems to be the first report of the ash as a host for H. radicicola.

ASH, MOUNTAIN (Sorbus americana)
+Polystictus hirsutus Fr., white saprot.
Washington - Whitman Co. (Dept. Plant Path.)
+Sphaeropsis sp., canker.
Michigan - (Collins)

ASH (Fraxinus sp.)
+Dothiorella sp.
District of Columbia - (Collins)

ASPEN - See Poplar

BANYAN (Ficus brevifolia)
+Colletotrichum gloeosporioides Penz., anthracnose.
Florida - Tropic, Brevard Co., January 9. (West)

BEECH, AMERICAN (Fagus americana)
Endothia gyrosa (Schw.) Fr.
Weir, J. R. Notes on the parasitism of Endothia gyrosa (Schw.) Fr. Phytopath. 15: 489-491. Aug. 1925.

BEECH (Fagus sp.)
Diatrype virescens (Schw.) Curt.
+South Carolina - Clemson College, April 16, 1911. (Ludwig)
+Nectria episphaeria (Tode) Fr. var. minor Dearn. & House
New York - Morehouseville (Dearness & House, New York St. Mus. Bull. 266: 69. June 1925.)

BIRCH, WHITE (Betula alba)
+Diplosporium flavidum Dearness & House
New York - Albany. (Dearness & House, New York St. Mus. Bull. 266: 94. June 1925.)

BIRCH, GREY (Betula populifolia)
+Melanconium subviridis Dearn. & House
New York - Gansevoart, Saratoga Co. (Dearness & House, New York St. Mus. Bull. 266: 81-82. June 1925.)

BIRCH (Betula sp.)
Canker (undet.)
New York - reported from three counties; Cayuga Co., August 15. (Chupp)

BOXELDER - See Maple, Boxelder

BUCKEYE, TEXAS (Aesculus arguta)
Guignardia aesculi (Pk.) V. B. Stewart, leafblotch.
+Missouri - Columbia, Boone Co., May 19. (Maneval) P.r.: *Kans.

BUCKTHORN, ALDER (Rhamnus alnifolia)
+Sphaerographium niveum Dearn. & House
New York - Newcomb, Essex Co. (Dearness & House, New York St. Mus. Bull. 266: 89-90. 1925.)

BUTTERNUT (Juglans cinerea)
Gnomonia leptostyla (Fr.) Ces. & DeNot., anthracnose.
New York - partly defoliates most trees in the state. (Chupp)
New Jersey - (Collins).
Michigan - average prevalence. (Nelson)
+Macroplodia juglandicola Dearn. & House
New York - Albany. (Dearness & House, New York St. Mus. Bull. 266: 86. 1925.)

CATALPA (Catalpa sp.)
Macrosporium catalpae Ell. & Mart., leafspot.
Reported from *N. Y. and Conn. as of slight importance.
Microsphaera alni vaccinii (Schw.) Salm., powdery mildew.
Reported from N. Y., Conn., and Del., of moderate importance.
Phyllosticta catalpae Ell. & Mart., leafspot.
Reported from N. Y., N. J., Pa.

CHESTNUT, AMERICAN (Castanea dentata)
Endothia parasitica (Murr.) P. J. and H. W. And., blight.
See article by G. F. Gravatt and Rush P. Marshall, pages 419-421.

CHESTNUT (Castanea sp.)
Blepharospora cambivora Petri, ink disease.
This disease does not occur in this country but on account of its importance in Europe the following references are given:
Dufrenoy, J. Les methodes de lutte contre la maladie du Châtaignier. Office Agr. Reg. du Massif Central, Clermont-Ferrand Bul. 5: 1-27. 1925.
____________ Maladie des chataigniers en Corse. Rev. Eaux et For. 63: 149-156. Apr. 1924.
Mangin, M. La reconstitution des chataigneraies détruites par l'"encre." Compt. Rend. Acad. Agr. France 11: 161-167. Feb. 1925.
Petri, L. Sur les conditions qui influencent la formation des zoosporanges chez la Blepharospora cambivora. Rev. Path. Vég. & Entom. Agr. 11: 259-261. Oct.-Dec. 1924.
+Dothiorella sp.
California - (Collins)

CHINABERRY (Melia azedarach)
Cercospora meliae Ell. & Ev., leafspot.
+Florida - Dade City, Dade Co., July 25. (West). P.r.: *La.

CHINABERRY (Melia sp.)
+Botryosphaeria ribis Gross. & Dug.
South Carolina, Fort Mott; Florida, Lake City and Monticello. (Mycol. 17: 99. 1925)
+Physalospora malorum (Pk.) Shear
Georiga, Milledgeville; Florida, Madison and Monticello. (Mycol. 17: 99. 1925)

COTTONWOOD - See Poplar

DOGWOOD, FLOWERING (Cornus florida)
+Septoria floridae Tehon & Daniels, leafspot.
Illinois - on leaves; Thebes, Alexander Co., August 17, 1922. (Mycol. 17: 244. 1925)

DOGWOOD, RED-OSIER (Cornus stolonifera)
+Mycosphaerella cornicola Tehon & Daniels
Illinois - in bark; Apple River Canyon, Jo Daviess Co., July 17, 1924.
"With this occurs a Phoma, so evidently associated as to suggest itself as the pycnidial form." (Mycol. 17: 240. 1925)

ELAEAGNUS ANGUSTIFOLIA - See Russian olive

ELDER (Sambucus sp.)
+Botryosphaeria ribis Gross. & Dug.
Florida - Titusville. (Mycol. 17: 99. 1925)

ELM, WINGED (Ulmus alata)
Uncinula macrospora Pk., powdery mildew.
+Florida - perithecia fall off soon after maturity; very common on plants around Gainesville, Alachua Co., August, September, and October. (West)
P.r.: *Ill., *Miss., *S. Car., *Texas.

ELM, AMERICAN (Ulmus americana)

Gnomonia ulmea (Sacc.) Thuem., blackspot.

+Michigan - common and general; many trees were noted as being heavily infected, but due to late development of the disease, defoliation did not occur early enough to cause much damage. (Nelson)

+Missouri - more or less common every year; Columbia, Boone Co. (Maneval)

+Taphrina ulmi (Fckl.) Johans., leaf blister.

*Missouri - Columbia, Boone Co., June 20. (Maneval)

ELM, SLIPPERY (Ulmus fulva)

Uncinula macrospora Pk., powdery mildew.

+Missouri - Columbia, Boone Co. (Maneval). P.r.: *Ind., *Va.

ELM, CHINESE (Ulmus parvifolia)

Ozonium omnivorum Shear, rootrot.

+Texas - prevalent. (Taubenhaus). P.r.: Ariz.

ELM (Ulmus sp.)

Dothidella ulmi (Dur.) Wint.

+Florida - Tampa, Hillsboro Co., July 10. (West). P.r.: Ind., *Kans., Mass., Mich., Nebr., N. J., N. Y., Ohio, Okla., Tenn., Vt.

Gnomonia ulmea (Schw.) Thuem., blackspot.

Reports not as general as in 1922 and 1923.

Sphaeropsis ulmicola Ell. & Ev., canker.

Wisconsin - major in nurseries; one nursery is budding on resistant stock quite successfully. (Fracker). P.r.: Md., Ohio, Pa., Wis.

EUCALYPTUS (Eucalyptus sp.)

+Botryosphaeria ribis Gross. & Dug.

Florida - Kissimmee. (Mycol. 17: 98. 1925)

GLIRICIDIA MACULATA

Corticium koleroga (Cke.) Hoehn, threadblight.

Porto Rico - (Tucker)

GROUNDSELBUSH (Baccharis halimifolia)

+Eriosporangium pistoricum Arth.

Florida - Goulds, Dade Co., September 11. (West)

+Placosphaeria baccharidis Dearn. & House

New York - Long Beach, Long Island. (Dearness & House, New York St. Mus. Bull. 266: 85. 1925.)

GUAMACHIL (Pithecolobium dulce)

+Phomopsis sp., twigblight.

Florida - local damage considerable; St. Petersburg, Pinellas Co., May 14. (West)

HACKBERRY (Celtis occidentalis)

Tubercularia sp.

Ohio - (Collins)

HAWTHORN, ENGLISH (Crataegus oxyacantha)
Bacillus amylovorus (Burr.) Trev., blight.
New York - twig blight and cankers on one tree caused considerable injury; only an occasional twig on surrounding trees attacked. (Orton)
P.r.: N. Y., Wash.

HAWTHORN (Crataegus sp.)
Fabraea maculata (Lév.) Atk. (Entomosporium maculatum Lév.), leafspot.
+Florida - Gainesville, Alachua Co., March and April. (West)
P.r.: Conn., Ga., *Mass., *Miss., *N. J., *N. Y., Wash., *Wis.
Fomes pomaceus Pers. f. crataegi Baxter
Michigan - (Baxter, Am. Jour. Bot. 12: 563. Nov. 1925)
Gymnosporangium clavariaeforme (Jacq.) DC., rust was erroneously reported from Connecticut in Supplement 42 (Pl. Dis. Rep. Suppl. 42: 331. 1925) It should have read Gymnosporangium globosum Farl.
Gymnosporangium globosum Farl., rust.
Connecticut - little injury. (Clinton)
+Monochaetia sp.
Florida - Citra, Marion Co., August 30. (West)
Phyllactinia corylea (Pers.) Karst., powdery mildew.
Washington - Whitman Co. (Dept. Plant Path.). P.r.: Ala., *Fla., Ind., Iowa, *N. Y., *Wash.
+Physalospora malorum (Pk.) Shear
South Carolina - Aiken. (Mycol. 17: 99. 1925)

HAZELNUT, AMERICAN (Corylus americana)
Taphrina coryli Nishida
Martin, E. M. Cytological studies of Taphrina coryli Nishida on Corylus americana. Trans. Wisconsin Acad. Sci. 21: 345-356. 1924.

HICKORY, WATER (Hicoria aquatica)
+Fusicladium effusum Wint., scab.
Florida - Wewahitchka, Calhoun Co., March 14. (West)

HICKORY, PIGNUT (Hicoria glabra)
+Gnomonia setacea (Pers.) Ces. & De Not. var. caryae Dearn. & House
New York - Greenbush, Rensselaer Co. (Dearness & House, New York St. Mus. Bull. 266: 76. 1925.
Microstroma juglandis (Bereng.) Sacc., witches'-broom.
+Florida - Gainesville, Alachua Co., March 20. (West). P.r.: *Ala., Wis.

HICKORY (Hicoria sp.)
+Marasmius musicola McDougall
Illinois - near Urbana. (McDougall, Trans. Ill. St. Acad. Sci. 17: 84. 1925)
+Physalospora malorum (Pk.) Shear
South Carolina, Aiken and Monks Corners; Florida, St. Lucie and High Springs. (Mycol. 17: 99. 1925)
+Sphaeropsis caryae Cke. & Ell., canker.
*Missouri - Columbia, Boone Co. (Maneval)

HOPTREE, COMMON (Ptelea trifoliata)
+Phyllosticta pteleicola Tehon & Daniels
Illinois - Starved Rock, La Salle Co. (Tehon & Daniels, Mycol. 17: 241. Nov.-Dec. 1925)

HORSECHESTNUT (Aesculus hippocastanum)
Colletotrichum sp.
+New York - (Collins). P.r.: N. J.
Guignardia aesculi (Pk.) V. B. Stewart, leafblotch.
More severe than in 1924 in Connecticut and Wisconsin; less severe in New York and New Jersey; locally severe in Delaware and Michigan. Always the important disease of this host in all localities.
Frost causing leaf injury
Washington - King and Whitman Counties. (Dept. Plant Path.)
Sunscald
+Delaware - more than the average amount; a prolonged drought period caused a severe burning of leaves. (Adams)

HORSE-TAIL TREE (Casuarina equisetifolia)
+Clitocybe tabescens Scop., rootrot.
Florida - responsible for the death of several large trees; Okeechobee, Okeechobee Co., May 13. (West)

JOINTFIR (Ephedra sp.)
Peridermium ephedrae Cke., rust.
+New Mexico - Dona Ana, Luna, Sierra, and Socorro Counties. (Crawford)
P.r.: *Ariz.

JUNEBERRY - See Shadblow

LINDEN, AMERICAN (Tilia americana)
Leafblotch - bacterial
New York - possibly statewide; produced large black blotches on the leaves; caused defoliation; considerable defoliation about Ithaca, Tompkins Co., September. (Chupp)

LOCUST, COMMON HONEY (Gleditsia triacanthos)
+Melasmia hypophylla (B. & Rav.) Sacc.
*South Carolina - Clemson College, October 20. (Ludwig)

MAGNOLIA, SOUTHERN (Magnolia grandiflora)
+Heterosporium sp.
Florida - Macclenny, Baker Co., May 8. (West)

MAGNOLIA (Magnolia sp.)
+Physalospora malorum (Pk.) Shear
South Carolina - Aiken. (Mycol. 17: 99. 1925)

MANGROVE (Rhizophora mangle)
Black canker - cause undetermined
Florida - many black cankers observed on plants growing near the road to Cape Sable; mostly on the trunks and larger branches; Flamingo Bay, Roe Co., May 10. (West)

MAPLE, BOXELDER (Acer negundo)
+Coniothyrium negundinis Tehon & Daniels
Illinois - Urbana, Champaign Co., June 3, 1922. (Mycol. 17: 243. 1925)
Fusarium negundi Sherb., redstain.
+Wisconsin - (Hubert, Jour. Agr. Res. 26: 451-452. 1923)
+Leptothyrium maximum Tehon & Daniels
Illinois - on twigs; Urbana, Champaign Co., June 3, 1922. (Mycol. 17: 245. 1925)
+Phacidium negundinis Tehon & Daniels
Illinois - on twigs; Urbana, Champaign Co., June 3, 1922. (Mycol. 17: 240. 1925)
+Sphaeropsis negundinis Tehon & Daniels
Illinois - on twigs; Urbana, Champaign Co., June 3, 1922. (Mycol. 17: 242-243. 1925)

MAPLE, JAPANESE (Acer palmatum)
+Verticillium sp., wilt.
Massachusetts - Springfield, Hampden Co., August 19. (Prouty)

MAPLE, STRIPED (Acer pennsylvanicum)
+Helminthosporium phomatae Dearn. & House
New York - Catskill Mountains. (Dearness & House, New York St. Mus. Bull. 266: 96-97. 1925)

MAPLE, NORWAY (Acer platanoides)
Gloeosporium sp.
+Ohio - (Collins). P.r.: Conn., Me., *N. Y., Va.
Phyllosticta sp.
+Ohio - (Collins). P.r.: Mo., *N. J., Va.

MAPLE, RED (Acer rubrum)
Phyllosticta minima (Berk. & Curt.) Ell. & Ev., leafspot.
Massachusetts - (Collins)
Rhytisma acerinum (Pers.) Fr., tarspot.
+Florida - Gainesville, Alachua Co., December 11. (West)
P.r.: Ala., *Conn., Del., *D. C., Ind., *Me., *Md., *Mass., *Miss., *N. J., *N. Y., *Vt., *Va., *W. Va.
+Septobasidium pedicellatum (Schw.) Pat.
Florida - Gainesville, Alachua Co., December 11. (West)
Uncinula circinata Cke. & Pk., powdery mildew.
+Delaware - Wilmington, October 8. (Adams)
+Missouri - more common on this host than on _A. saccharum_; Columbia, Boone Co. (Maneval)

MAPLE, SUGAR (Acer saccharum)
Uncinula circinata Cke. & Pk., powdery mildew.
+Missouri - found every year; Columbia, Boone Co. (Maneval)
P.r.: *Ind., Iowa, N. Y.
Verticillium sp., wilt.
*+Massachusetts - Springfield, Hampden Co., August 19. (Prouty)
Sun scorch
+Missouri - considerable defoliation from scorching of leaves in hot and dry weather following the late frosts in May; Columbia, Boone Co. (Maneval)

MAPLE, SYCAMORE (Acer pseudoplatanus)
+Nectria cinnabarina Fr., canker.

MAPLE, MOUNTAIN (Acer spicatum)
+Acrospermum cuneolum Dearn. & House
New York - Newcomb, Essex Co. (Dearness & House, New York St. Mus. Bull. 266: 67. 1925)
+Cenangium griseum Dearn. & House
New York - Newcomb, Essex Co. (Dearness & House, New York St. Mus. Bull. 266: 62. 1925)
+Leptothyrella aceris Dearn. & House
New York - Newcomb, Essex Co. (Dearness & House, New York St. Mus. Bull. 266: 90. 1925)
+Ombrophila setulata Dearn. & House
New York - Newcomb, Essex Co. (Dearness & House, New York St. Mus. Bull. 266: 60. 1925)

MAPLE (Acer sp.)
+Physalospora malorum (Pk.) Shear
North Carolina, Southern Pines; South Carolina, St. Stephen, Charleston, Aiken; Florida, Orlando. (Mycol. 17: 99. 1925)
Rhytisma acerinum (Pers.) Fr., tarspot.
Jones, A. G. Life history and cytology of Rhytisma acerinum (Pers.) Fr. Ann. Bot. 39: 41-75. Jan. 1925.
+Septoria pseudoplatani Rab. & Desm.
Idaho - Chatcolet. (Wash. Dept. Plant Path.)
Verticillium sp., wilt.
Connecticut - (Clinton)
Chlorosis - excess of lime
Texas - prevalent in limestone regions. (Taubenhaus)
Sun or leaf scorch, leaf scald.
Connecticut - less than average year. (Clinton)
New York - statewide, June 16. (Chupp)
Delaware - very prevalent during July, especially in Sussex and Kent Counties. (Adams)
Michigan - very common and the cause of considerable damage to a wide variety of plants; hot drying winds of June and July followed by prolonged drought was apparently responsible for the large amount of scorch. (Nelson)

MONKEYPUZZLE (Araucaria imbricata)
+Pestalozzia sp., leafspot.
Florida - not serious; St. Petersburg, Pinellas Co., July 14. (West)

OAK, WHITE (Quercus alba)
Armillaria mellea (Vahl.) Quel., rootrot.
+Maryland - (Collins)
+Microstroma album (Desm.) Sacc., frosty mildew.
Florida - Gainesville, Alachua Co., April 8. (West). P.r.: W. Va.

OAK, SAND BLACKJACK (Quercus catesbaei)
+Microsphaera alni (Wallr.) Wint., powdery mildew.
Florida - Gainesville, Alachua Co., March 17. (West)

AK, EVERGREEN (Quercus engelmannii)
+Cronartium strobilinum (Arth.) Hedgc. & Hahn, rust.
Florida - Fort Pierce Farms. (West)

AK, LAUREL (Quercus laurifolia)
+Cronartium strobilinum (Arth.) Hedgc. & Hahn, rust.
Florida - Gainesville, Alachua Co., August 30. (Rhoads & West)

AK, BURR (Quercus macrocarpa)
Polyporus dryophilus Berk.
+Minnesota - not very prevalent. (Div. Plant Path.). P.r.: Nebr., Wis.

AK, WATER (Quercus nigra)
+Cronartium strobilinum (Arth.) Hedgc. & Hahn, rust.
Florida - Ft. Pierce, St. Lucie Co., May 7. (West)
Taphrina coerulescens (Mont. & Desm.) Tul., leaf blister.
*Florida - Deland, March 23. (Jenkins). Reported several times from central and northern sections. (West)
South Carolina - unimportant in 1925; found in Sandhill and Piedmont regions; slight. Due West, April 17. (Fenner)
P.r.: *Ala., Fla., *Miss., *S. Car.
Leafburn - cause unknown
South Carolina - Clemson College, May 27. (Fenner)

AK, BLACK (Quercus velutina)
Endothia gyrosa (Schw.) Fr., (Weir, James R. Notes on the parasitism of Endothia gyrosa (Schw.) Fr. Phytopath. 15: 489-491. 1925)
+Rhizoctonia sp., threadblight.
Indiana - on a small sapling the mycelium grew up along stem out along the leaf petioles, spreading over the lower epidermis, killing the leaf tissues; LaFayette, October 17. (Gardner)
Taphrina coerulescens (Mont. & Desm.) Tul., leafblister.
+Virginia - (Collins). P.r.: D. C., *Md., *Mass., *N. Y., *Pa.

AK, LIVE (Quercus virginiana)
+Gloeosporium sp.
Mississippi - (Collins)

AK (Quercus sp.)
+Botryosphaeria ribis Gross. & Dug.
Florida - Lake City. (Mycol. 17: 99. 1925)
Gnomonia veneta (Sacc. & Speg.) Kleb., anthracnose.
New York - Suffolk Co., July 17. (Chupp)
New Jersey - more than in average year; severe in some localities; some twigs almost defoliated; Woodbury, May 15. (Dept. Plant Path.)
Michigan - general; less than average year; not important. (Nelson)
Hypoxylon marginatum (Schw.) Berk.
**+South Carolina - Clemson College, April 16, 1911. (Ludwig). P.r.: Ala., Ind.
Phyllosticta sp., leafspot.
New Jersey - New Brunswick, June 29. (Dept. Plant Path.)
+Physalospora malorum (Pk.) Shear
North Carolina, Southern Pines; South Carolina, Ft. Mott and Aiken; Georgia, Macon; Florida, St. Cloud and Lake Alfred. (Mycol. 17: 99. 1925)

OSAGE ORANGE (Maclura pomifera)
Hydnum omnivorum Shear (Ozonium omnivorum Shear)
Texas - near Paris in 1903. (Shear, Jour. Agr. Res. 30: 476-477. 1925)

PERSIMMON (Diospyros sp.)
+Physalospora malorum (Pk.) Shear
Georgia - Rochelle. (Mycol. 17: 99. 1925)

PEPPER TREE, CALIFORNIA (Schinus molle)
Ozonium omnivorum Shear, Texas rootrot.
+Arizona - reported to have killed a young tree in an infested district near Phoenix. (Ariz. News Letter St. Comm. Agr. & Hort. 3: 7. Aug. 31, 1925). P.r.: *Texas.

PHYSICNUT, FRENCH (Jatropha curcas)
+Colletotrichum sp., leafspot.
Florida - Dade City, Dade Co., July 25. (West)

PISTACHE, CHINESE (Pistacia chinensis)
+Corticium stevensii (Noack) Burt.
Florida - caused defoliation of infected trees, Gainesville, Alachua Co., August 8. (West)

PLANETREE, SYCAMORE (Platanus occidentalis)
Gnomonia veneta (Sacc. & Speg.) Kleb., anthracnose.
Reported as less prevalent than in 1924 in Connecticut, New York, New Jersey, and Delaware, and more prevalent in Iowa and +Utah-(great numbers will be moved because of the disease. (Richards); +Washington - in most cases reported as severe; Spokane Co. (Dept. Plant Path.)
+Ostropa mellea Dearn. & House
Vermont - Charlotte. (Dearness & House, New York St. Mus. Bull. 266: 67. 1925)
Lightning
Schaffner, J. H. Effect of lightning on trunk of Platanus occidentalis. Bot. Gaz. 80: 226-227. Oct. 1925.

PLANETREE, ORIENTAL (Platanus orientalis)
+Gnomonia veneta (Sacc. & Speg.) Kleb., anthracnose.
New Jersey - less prevalent than average year; Mercer, June 21. (Dept. Plant Path.)

PLANETREE (Platanus sp.)
+Physalospora malorum (Pk.) Shear
South Carolina - St. Stephen. (Mycol. 17: 99. 1925)

POPLAR, BALSAM (Populus balsamifera)
+Leptosphaeria borealis Ell. & Ev. var. populi Dearn. & House
New York - North Elba, Essex Co. (Dearness & House, New York St. Mus. Bull. 266: 74. 1925)

POPLAR, SOUTHERN COTTONWOOD (Populus deltoides)
Cylindrosporium sp.
+New York - (Collins)

POPLAR, CAROLINA (Populus eugenei)

Cytospora sp., canker.

+Washington - Whitman Co. (Dept. Plant Path.) P.r.: Ohio.

Crowngall - undet.

Arizona - on a ranch near Phoenix, June. (St. Comm. Agr. & Hort. News Letter 3: 4. June 30, 1925)

POPLAR, LOMBARDY (Populus nigra italica)

Cercospora sp., leafspot.

+Florida - Live Oak, Suwanee Co., October 20. (West). P.r.: Ala.

+Septoria sp.

Maryland - (Collins)

POPLAR, QUAKING ASPEN (Populus tremuloides)

Marssonia populi (Lib.) Sacc.

Wyoming - Yellowstone Park, August 22. (Conard). P.r.: *Ida., S. Dak., *Wash., *Wis.

Marssonia sp., anthracnose.

Washington - Whitman Co. (Dept. Plant Path.)
P.r.: *Ida., S. Dak., *Utah, *Wash., *Wis.

POPLAR or ASPEN (Populus spp.)

+Armillaria mellea (Vahl) Quel., rootrot.

Minnesota - does a considerable amount of damage on most of the poplar areas in Minnesota; often found in connection with Fomes igniarius (L.) Fr. (Div. Plant Path.)

Bacterium tumefaciens EFS. & Town., crowngall.

+Texas - slightly important. (Taubenhaus). P.r.: Conn., Kans., Minn., N. J., Utah, Wyo.

Dothichiza populea Sacc. & H. Briard, canker.

Connecticut - average amount; 28 reports; a moderate to considerable amount of injury; reported chiefly from nurseries; Cromwell, July 17. (Hunt). P.r.: Conn., *D. C., Ill., Ind., Md., Mass., Minn., N. J., *N. Mex., *N. Y., Ohio, *Pa., R. I., Wis.

Fomes igniarius (L.) Fr., white heartrot.

Minnesota - attacks large areas of poplars; severe; on some as high as 80 or 90 per cent of the trees are damaged; all ages of host are attacked. (Div. Plant Path.)

Gloeosporium sp.

Texas - unimportant. (Taubenhaus)

Hypoxylon pruinatum (Klotzsche) Cke., canker.

Maine - (Schreiner, E. J. Preliminary survey of Hypoxylon poplar canker in Oxford Co., Maine. Mycol. 17: 218-220. 1925)
P.r.: Me., Mich., N. Y.

Marssonia populi (Lib.) Magn., leafspot.

+Michigan - common locally and probably statewide in its distribution. (Nelson). P.r.: Calif., *D. C., *Ida., *Md., Mich., *Nebr., *N. Y., S. Dak., *Va., *Wash., *Wis.

Melampsora sp., rust.

New Mexico - common; produces some damage; Mesilla Valley. (Crawford)

Phoradendron flavescens macrophyllum Engelm., mistletoe.

New Mexico - of considerable importance; so common on cottonwoods that it causes their death in a few years by reducing vigor of tree attacked; Mesilla Valley. (Crawford)

Taphrina aurea Fr., yellow leaf blister.
Washington - (Collins). P.r.: *Calif., *Iowa, *Me., *Mass., *N. J., *N. Y., *Oreg., *Wash.
Diseases
Baker, F. S. Aspen in the central Rocky Mountain region. U. S. Dept. Agr. Bull. 1291. 1925. Diseases mentioned are Fomes igniarius (heartrot); Fomes applanatus (buttrot); canker (organism unknown); Cytospora chrysosperma (canker); Uncinula salicis (powdery mildew); Sclerotium bifrons (leaf fungus).

REDBUD (Cercis sp.)
+Physalospora malorum (Pk.) Shear
Florida - Madison. (Mycol. 17: 99. 1925)

RUSSIAN-OLIVE (Elaeagnus angustifolia)
+Coniothyrium sp.
Colorado - (Collins)

SASSAFRAS, COMMON (Sassafras variifolium) (S. officinale)
Phyllosticta sp., leafspot.
New Jersey - New Brunswick. (Dept. Plant Path.)
+Physalospora malorum (Pk.) Shear
South Carolina, Ft. Mott; Georgia, Andersonville. (Mycol. 17: 99. May-June 1925)

SERVICEBERRY - See Shadblow

SHADBLOW, SERVICEBERRY, JUNEBERRY (Amelanchier sp.)
+Apiosporina collinsii (Schw.) Hoehn., witches'-broom.
Washington - Whitman Co. (Dept. Plant Path.)
Gymnosporangium clavariaeforme (Jacq.) DC., rust.
+Washington - Okanogan Co. (Dept. Plant Path.)
P.r.: *Colo., Del., *Mass., *Mich., *Nebr., N. H., *Utah, Vt., Wis., Wyo.
Gymnosporangium nelsoni Arth., rust.
*Wyoming - Yellowstone Park. August 20. (Conard). P.r.: *Colo., *Mont., *Nebr., *N. Mex., Utah, *Wyo.

SOAPBERRY, CHINESE (Sapindus mukorossi carinatus)
+Corticium stevensii (Noack) Burt.
Florida - defoliates the branches attacked; Gainesville, Alachua Co., August 22. (West)

SWEETGUM (Liquidambar sp.)
+Botryosphaeria ribis Gross. & Dug.
Georgia, Macon; Florida, Kissimmee. (Mycol. 17: 98. 1925)
+Physalospora malorum (Pk.) Shear
South Carolina, Aiken; Georgia, Thomasville; Florida, Madison. (Mycol. 17: 98. 1925)

SWEETLEAF, COMMON (Symplocos tinctoria)
Exobasidium symploci Ell. & Mart., bud gall.
+Georgia - (Collins). P.r.: *Ala., Fla., Ind., Miss.

SYCAMORE - See Planetree

TULIPTREE (Liriodendron tulipifera)
+Botryosphaeria ribis Gross. & Dug.
Georgia, Andersonville. (Mycol. 17: 99. 1925)
+Myxosporium liriodendri Dearn. & House
New York - on the shoots; Oneida, Madison Co. (Dearness & House, New York St. Mus. Bull. 266: 92. 1925)
+Physalospora malorum (Pk.) Shear
South Carolina, Aiken. (Mycol. 17: 99. 1925)

WALNUT, HINDS (Juglans hindsii)
+Pythiacystis sp., crown canker.
California - Smith, R. E. and E. H. Smith. Further studies on Pythiaceous infection of deciduous fruit trees in California. Phytopath. 15: 389-404. 1925.

WALNUT, BLACK (Juglans nigra)
Gnomonia leptostyla (Fr.) Ces. & DeNot., anthracnose.
Delaware - Georgetown, July 9. (Adams)

WALNUT, JAPANESE (Juglans sieboldiana)
Rosette - physiological
*+South Carolina - St. George, Dorchester Co., September 1. (Ludwig)
P.r.: Dela., *Mo.

WALNUT (Juglans sp.)
+Botryosphaeria ribis Gross. & Dug.
Delaware - Seton. (Mycol. 17: 98. 1925)
Gnomonia leptostyla (Fr.) Ces. & DeNot., anthracnose.
New Jersey - Middlesex, Somerset and Warren Counties, August 1. (Dept. Plant Path.)
+Marasmius misicola McDougall
Illinois - near Urbana. (McDougall, Trans. Ill. State Acad. Sci. 17: 84. 1925)
+Pestalozzia sp., leafspot.
Florida - Romeo, Marion Co., October 10. (West)

WILLOW, PEACHLEAF (Salix amygdaloides)
+Paracytospora salicis Petr.
South Dakota - on the branch; Northville. (Petrak, Ann. Myc. 23: 82-83. 1925)

WILLOW (Salix longipes) (S. amphibia)
Melampsora salicina capreae (Pers.) Wint., rust.
+Florida - Homestead, Dade Co., December 11. (West)

WILLOW, SHINING (Salix lucida)
+Helicodesmus albus Linder
Massachusetts - Cambridge. (Linder, Amer. Jour. Bot. 12: 267. 1925)

WILLOW, SILKY (Salix sericea)
+Septomyxa Dearn. & House
New York - New London, Oneida Co. (Dearness & House, New York St. Mus. Bull. 266: 93. 1925)

WILLOW (Salix sp.)
Bacterium tumefaciens EFS. & Town., crowngall.
Connecticut - Hartford, August 8. (Hunt). P.r.: Conn., Texas.
+Cuscuta sp., dodder.
Washington - Walla Walla Co. (Dept. Pl. Path.)
+Macrophoma sp.
Kentucky - (Collins)
+Phyllosticta salicicola Thuem., leafspot.
Connecticut - (Collins)
+Physalospora malorum (Pk.) Shear
Florida - Vero, Pampano, St. Cloud. (Mycol. 17: 99. 1925)
+Stysansus sp.
Pennsylvania - (Collins)
Witches'-broom - undet.
Washington - Asotin and Walla Walla Counties. (Dept. Plant Path.)

WOOD-OIL TREE, JAPAN (Aleurites cordata)
+Colletotrichum sp., anthracnose.
Florida - Dade City, Pasco Co., July. (West)

WOOD-OIL TREE, CHINA (Aleurites fordii)
+Alternaria sp., leafspot.
Florida - common but unimportant; attacks the older leaves, particularly near the margins; Gainesville, Alachua Co., July. (West)
+Cercospora sp., leafspot.
Florida - Gainesville, Alachua Co., August and November. (West)
+Colletotrichum sp., anthracnose.
Florida - Gainesville, Alachua Co., July. (West)
+Corticium stevensii (Noack) Burt.
Florida - uncommon; causes defoliation when present; attacks stems, leaves, and fruits while green; Gainesville, Alachua Co., July, August. (West)
+Pestalozzia sp., leafspot.
Florida - produces dark brown or blackish spots, 5-15 mm. in diameter on the older leaves; Gainesville, Alachua Co., July. (West)
+Phyllosticta sp., leafspot.
Florida - an unidentified species of Phyllosticta was the cause of large red-brown spots or blotches which frequently involved 25 per cent of the leaf surface of the tree; the spots appear as minute specks on the half grown leaves and spread as the leaf grows older until in many cases the entire leaf is killed; Gainesville, Alachua Co., July-September. (West)
+Chlorosis - lime injury.
Florida - a severe chlorosis follows the planting of the host in limed soil in some sections; Gainesville, Alachua Co., September. (West)

Recent literature on general forest disease subjects

Anon. Forest diseases and losses, with figures to demonstrate the toll of fungi and diseases. Timberman 26: 225-226. 1925.

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"Fomes" ellisianus, F. fraxinophilus, F. pomaceus f. crataegi f. nov.

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Wilson, M. The Phomopsis disease of conifers. Bull. For. Comm. Great Britain 6. 34 pp. 1925.

DISEASES OF ORNAMENTALS

AGERATUM (Ageratum sp.)
*+Puccinia conoclinii Seym., rust.
North Carolina - Raleigh, October 2. (Curran)

ALTHEA, SHRUB (Hibiscus syriacus)
+Choanephora conjuncta Couch
North Carolina - Chapel Hill. (Couch, Jour. Elisha Mitchell Sci. Soc. 41: 143-144. Sept. 1925)

AMARYLLIS, HOUSE (Hippeastrum equestre)
+Sclerotium rolfsii Sacc., stemrot.
Florida - caused a very serious loss in seedbeds; Sanford, Seminole Co., September 2. (West)

AMPELOPSIS, VIRGINIA CREEPER (Ampelopsis quinquefolia)
+Corticium stevensii (Noack) Burt.
Florida - Gainesville, Alachua Co., August 22. (West)

AMPELOPSIS, BOSTON IVY, JAPANESE CREEPER (Ampelopsis tricuspidata)
Plasmopara viticola (Berk. & Curt.) Berl. & DeToni, downy mildew
Ducomet, V. Plasmopara viticola sur Ampelopsis veitchii. Rev. Path. Vég. & Entom. Agr. 12: 129-130. 1925.
Muth, F. Zum Auftreten der Plasmopara viticola auf Ampelopsis veitchii. Nachrichtenbl. Deut. Pflanzenschutzd. 5: 30-31. 1925.
Winter injury
Connecticut - often killed the horizontal branches especially the bark and wood on the upper side; leaves died suddenly in early summer. (Clinton)

AMPELOPSIS (Ampelopsis sp.)
Peronospora sp.
Trinchieri, G. "Peronospora" e ampelopsis. Ital. Vinic. 15: 422-423. July 5, 1925.

ARROWROOT, BERMUDA (Maranta arundinacea variegata)
+Gloeosporium sp., leafspot.

ASPARAGUS-BEAN (Vigna sesquipedalis)
+Cladosporium vignae Gardner
Indiana - Lafayette. (Gardner, Phytopath. 15: 457. Aug. 1925)

ASPARAGUS FERN (Asparagus plumosus)
+Cladosporium sp.
Florida - caused spotting of the branches, particularly at the nodes, and yellowing of the entire frond; Spring Garden, Volusia Co., June 5. (West)
+Colletotrichum sp.
Florida - Central section; October and December. (West)
+Helminthosporium sp.
Florida - Altamonte Springs, Seminole Co., December 11. (West)

ASPIDISTRA, COMMON (Aspidistra lurida)
Colletotrichum omnivorum Hals.
Campanile, Guilia. Attacco e diffusione in Italia del Colletotrichum um omnicorum Hals. sull' Aspidistra lurida. (Attack and dissemination in Italy of Colletotrichum omnivorum Hals. on Aspidistra lurida.) Boll. Mensile R. Staz. Pat. Veg. 5: 60-66. 1924.

ASTER, CHINA (Callistephus chinensis)
Coleosporium solidaginis (Schw.) Thuem., rust.
Minnesota - Elgin, September 30. (Div. Plant Path.)
New Mexico - of some importance; more than in 1924; severe, causing death of plants; Mesilla Valley, Las Cruces, Dona Ana Co. (Crawford)
Coleosporium sonchi-arvensis (Pers.) Lév., rust.
Kansas - locally prevalent; importance slight; Manhattan, August. (White)

Fusarium conglutinans callistephi Beach, wilt.
New York - considerable loss experienced by growers; general in distribution. (Chupp)
Indiana - worse than in 1924; high temperatures in May and especially in July; Allen, Marion, and St. Joseph Co. (Gardner)
Michigan - mostly in southern part of state; warm dry temperature, not especially favorable; not so apparent as usual; rotation is being more generally practiced by the commercial growers; seed treatment used. (Nelson)
Minnesota - was of considerable importance; Minneapolis, June 30. (Div. Plant Path.)
Kansas - of slight importance; Manhattan. (White)
Fusarium sp., wilt, rootrot.
Connecticut - two reports; New Haven, July 2. (McCormick)
New York - abundant on muck; common throughout state; a Fusarium differing somewhat from F. conglutinans callistephi was isolated; Genesee and Orleans Co. (Felix)
Found in vascular system, also on external portions. (Div. Plant Path.)
*+District of Columbia - Department of Agriculture greenhouse, July 24. (Brierley)
*+Illinois - Chicago, July 13. (Brierley)
Wisconsin - more prevalent; statewide; of major importance when associated with yellows; Madison, July 1. (Vaughan)
Iowa - general; severe locally. (Dept. Plant Path.)
Idaho - fairly common. (Hungerford)
Rose, R. C. Suggestions on control of aster wilt. Minn. Hort. 53: 149-150. May 1925.
+Phomopsis callistephi Tehon & Daniels
Illinois - on stems; Shelbyville, Shelby Co., September 20, 1924. (Mycol. 17: 242. 1925)
Yellows - undet.
Connecticut - Wethersfield Co., July 28. (Clinton)
New York - common in home gardens; Genesee, Orleans, Westchester Counties, (Felix)
New Jersey - Summit, Union Co., Sept. (Dept. Plant Path.)
Delaware - more prevalent; Bellevue, July 25. (Adams)
*+District of Columbia - Department of Agriculture greenhouse, July 24. (Brierley)
Virginia - Norfolk, September. (McWhorter)
Indiana - practically of no importance in 1925 while in 1924 it was exceedingly destructive. (Gardner)
+Ohio - considerable loss. (May)
Michigan - much more than of average year; 75 to 90 per cent of the plantings were infested; loss 50 to 75 per cent throughout state; by far the most destructive and widespread disease of ornamentals; resulted in almost a complete failure of the majority of the plantings. (Nelson)
Wisconsin - more prevalent; statewide; Madison, July 20. (Vaughan)
Minnesota - it is becoming almost impossible to raise good asters around the Twin Cities; in some beds 70 to 90 per cent of the plants were worthless because of yellows by the end of the season. (Div. Plant Path.)

+Iowa - 20 per cent reduction. (Dept. Plant Path.)
Kansas - severe; Manhattan. (White)
Kunkel, L. O. Incubation period of aster yellows in its insect host. (Abstract) Phytopath. 16: 67. Jan. 1926.
__________ Insect transmission and host range of aster yellows. Science n.s. 62: 524. 1925. (Abstract of paper presented at Nat. Acad. Sci. Madison. 1925)

Diseases
Loucks, Kenneth W. Asters, how to grow them. Florida Fruits & Flowers 3 (2): 44-45; (3): 64. 1925.
Weiss, F. Diseases of the china aster. Am. Flor. 44: 269-270. Feb. 28, 1925. (Stemrot or wilt, damping-off, yellows)

AZALEA (Azalea sp.)
Exobasidium vaccinii (Fckl.) Wor., gall. (E. azaleae Pk.)
Connecticut - Westville, June 2. (Clinton)
Delaware - very prevalent with ornamental varieties in greenhouses; Wilmington, May 8. (Adams)
Phyllosticta sp.
+Pennsylvania - (Collins). P.r.: Ala.

BAMBOO, FEATHER (Bambusa vulgaris)
+Puccinia melanocephala Syd., rust.
Florida - Brooksville, Hernando Co., November 12. (West)

BAMBOO (Bambusa sp.)
Helminthosporium sp.
Florida - causes discoloration and dropping of foliage, St. Petersburg, Pinellas Co., July 19. (West)
+Melanconium bambusae Turconi
Florida - causes black spots on the stems, Ft. Myers, Lee Co., May 23. (West)

BEAUTYBERRY, AMERICAN (Callicarpa americana)
+Meliola inermis Kalchbr. & Cke.
Florida - M. inermis parasitized by Arthrosporium parasiticum Wint.; an interesting collection; Boardman, Marion Co., December 1. (West)

BEGONIA (Begonia sp.)
*+Aphelenchus olesistus Ritzema Bos, nematode.
Pennsylvania - greenhouse; Beaver, March 16. (McCubbin)
Aphelenchus ormerodis Ritzema Bos, nematode.
*New York - greenhouse; Flushing, Long Island, November 12, 1924.
Cercospora sp., leafspot.
+Georgia - caused heavy spotting in one greenhouse; a premature defoliation and yellowing of leaf; Savannah, November 23. (Boyd)
P.r.: *Texas.
Leafspot and tipburn caused by water on foliage and exposure to intense light.
*West Virginia - Elbert, June. (Weiss)
*Virginia - spots appear as water drop burns, Norfolk, May. (Weiss)
Intumescence
Connecticut - unfavorable moisture conditions in greenhouse made many of the plants of little value; Norwalk, October 8. (Clinton)

BELLFLOWER - See Campanula sp.

BOUGAINVILLEA, GREAT (Bougainvillea spectabilis)
+Mosaic - undet.
Florida - St. Cloud, Osceola Co., June 13. (West)

BOWSTRING HEMP (Sansevieria zeylanica)
+Fusarium sp., leafspot.
Florida - Jupiter, Palm Beach Co., October 29. (West)

BOX, COMMON (Buxus sempervirens)
Phyllosticta sp.
+Virginia - (Collins). P.r.: N. J., *N. Y.

BUTTERFLY-PEA (Clitoria ternatea)
+Cercospora cruenta Sacc., leafspot.
Florida - Gainesville, Alachua Co., October 26. (West)

BUTTONBUSH, COMMON (Cephalanthus occidentalis)
+Tympanis cephalanthi Dearn. & House
New York - Karner, Albany Co. (Dearness & House, New York St. Mus. Bull. 266: 63-64. 1925)

CALENDULA (Calendula officinalis)
+Botrytis sp., leaf blight.
Missouri - Greenhouse, Columbia, May 1. (Maneval)
+Fumago sp.
Missouri - caused considerable damage in greenhouse at Columbia, November. (Maneval)
Puccinia emiliae Henn., rust.
*+Missouri - plants rather heavily infected in a greenhouse, Columbia, about October 1. (Maneval)
Mosaic - undet.
Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bull. 82: 39-91. 1925.

CAMELLIA, COMMON (Camellia japonica)
+Phyllosticta sp., leafspot.
Georgia - (Collins)
Florida - Federal Point, Putnam Co., December 31. (West)
Leafspot - undet.
Georgia - quite important locally; peculiar purplish blister spots on underside of leaf; develops most rapidly during cool wet weather - fall, winter, spring; observed only in Thomas Co., Thomasville, February 9. (Boyd)

CAMPANULA SP.
Sclerotinia sclerotiorum (Lib.) Mass.
Rees, J. A new disease of cultivated Campanulas due to Sclerotinia sclerotiorum (Lib.) Mass. Welsh Jour. Agr. 1: 188-190. 1925. The disease abated in drier weather and was controlled by removing and burning diseased stems and by soil sterilization.

CANNA (Canna indica)
  Puccinia cannae (Wint.) Henn., rust.
    Florida - Oneco, Manatee Co., December 11. (West)

CAPE-MARIGOLD (African Daisy) (Dimorphotheca annua)
  +Fusarium sp., wilt.
    Washington - Whitman Co. (Dept. Plant Path.)

CARNATION (Dianthus caryophyllus)
  **+Cladosporium sp., leafspot.
    Maryland - Washington Grove, September 25. (Weiss)
  Corticium vagum Berk. & Curt., stemrot.
    New York - local; Yonkers, Westchester Co., August. (Massey)
    +Kansas - slight; Edson, July 3. (White)
    +Oregon - general in Oregon greenhouses; presence requires special consideration in management of plants in greenhouse. (Barss)
  Heterosporium echinulatum (Berk.) Cke., leafspot.
    **+Maryland - Washington Grove, September 25. (Weiss)
    P.r.: Calif., Conn., *N. Y., Oreg.
  Pythium debaryanum Hesse, damping-off.
    Pape, H. Ueber eine durch Pythium debaryanum Hesse verursachte Stecklingskrankheit der Nelken. (A disease of carnation cuttings caused by Pythium debaryanum Hesse). Die Kranke Pflanze 2: 64-68. 1925.
  Septogloeum sp.
    Van Poeteren, N. Verslag over de werkzaamheden van den Plantenziektenkundigen Dienst in het jaar 1924. (Report of the activities of the Phytopathological Service in the year 1924). Versl. en Meded. Plantenziektenkundigen Dienst te Wageningen 41: 62. 1925.
  Sporotrichum poae Pk., budrot.
    **+Virginia - Richmond, Henrico Co., January. (Weiss)
    P.r.: Mass., Nebr., N. J., Pa.
  Uromyces caryophyllinus (Schrank) Wint., rust.
    General in distribution in greenhouses throughout country; very prevalent on Laddie variety (Delaware); first report from *Virginia; also found in some field plantings (South Carolina); controlled by dip and spray of liver of sulfur (K_2S_1) 1 ounce to 2 gallons of water (Michigan).
  Diseases
    Svec, F. Choroby a skudci karafiáru. Ochrana Rostl. 5: 37-41. 1925.

CASTOR-BEAN (Ricinus communis)
  Ozonium omnivorum Shear, rootrot.
    Texas - prevalent; 1 per cent loss. (Taubenhaus)
  Damping-off
    Arizona - two cases where host had been planted for shade purposes; no appreciable damage as only the weaker plants were killed. (Ariz. News Letter 3: 7. Apr. 30, 1925)

CASTOR-BEAN (Ricinus sp.)
  +Botryosphaeria ribis Gross. & Dug.
    Florida - St. Lucie. (Mycol. 17: 99. 1925)

CENTURY PLANT (Agave americana)
+Coniothyrium agaves (Mont.) Sacc.
*Virginia - Montross, Westmoreland Co., January. (Wingard)

CHRISTMASBERRY (Photinia arbutifolia)
+Fusicladium photinicola McClain, scab.
California - (McClain, Phytopath. 15: 171-182. Mar. 1925)

CHRYSANTHEMUM (Chrysanthemum sp.)
Aphelenchus olesistus Ritzema Bos, nematode.
Schenk, P. J. Aaltjesziekte der chrysanten. Floralia 46: 772-773. Dec. 4, 1925.
Erysiphe cichoracearum DC., powdery mildew.
Reported from several states, general.
+Fuligo sp., slimemold.
Missouri - probably in manure; all over the beds and plants; plants disfigured and injured; in a greenhouse, Kansas City, July. (Maneval)
Fusarium sp., damping-off.
Florida - rooted cuttings affected; Tampa, Hillsborough Co., July 24. (West)
Puccinia chrysanthemi Roze, rust.
Virginia - Norfolk region, September. (McWhorter)
+Sclerotinia sclerotiorum (Lib.) Mass., stemrot.
Michigan - caused some damage to stock plants in one large greenhouse. (Nelson)
Septoria chrysanthemella Cav., leafspot.
+Virginia - not common; severe when found; Norfolk region; September. (McWhorter)
Florida - Gainesville, Alachua Co., July 9. (West)
Verticillium sp., wilt.
New Jersey - Rutherford, May 8. (Dept. Plant Path.)
+Michigan - of considerable importance; more than in average year; caused severe losses in some greenhouses; loss was greatly decreased by attention to sanitation and sterilization of potting soil. (Nelson)
Yellows - undet.
+New Jersey - New Brunswick, November. (Dept. Plant Path.)
+Michigan - present in greenhouses; affecting a good many varieties; increasing; identical with aster yellows. (Nelson). P.r.: Pa.
Nelson, R. Chrysanthemum yellows: A new disease in the greenhouse. Michigan Sta. Quart. Bull. 7: 157-160. 1925.
Diseases
Chabanne, G. Culture des chrysanthèmes á la grande fleur, augmenté d'une notice sur la fécondation des chrysanthèmes par M. Gerard et d'une autre sur le Maladies et parasites par M. J. Chifflot. 12 ed. rev. et mise a jour par Ph. Rivoire Lyon (1924?).
Chifflot, J. Maladies et parasites des chrysanthèmes. Observations faites de November 1923 a November 1924. Chrysanthème 28: 596-598. 1925.

LOCKVINE, BENGAL (Thunbergia grandiflora)
+Bacterium tumefaciens EFS. & Town., crowngall.
Florida - occasional but unimportant; Winter Park, Orange Co., June 23. (West)
+Nematode - undet.
Florida - Eustis, Lake Co., November 13. (West)

CLOCKVINE, LAUREL (Thunbergia laurifolia)
+Bacterium tumefaciens EFS. & Town., crowngall.
Florida - Palm Beach, Palm Beach Co., May 9. (West)

COLUMBINE, AMERICAN (Aquilegia canadensis)
+Phyllosticta aquilegiae Tehon & Daniels
Illinois - Marion, Williamson Co. (Tehon & Daniels, Mycol. 17: 241. 1925)
Mosaic - undet.
Iowa - See Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 66. 1925.

CORNFLOWER (Centaurea cyanus)
Puccinia cyani (Schl.) Pass., rust.
Connecticut - local; Westville, July 5. (Clinton)
*Washington - Pullman, Whitman Co., June 21. (Dept. Plant Path.)
P.r.: Conn., *D. C., *Mass., *Oreg., *Pa., *Va., *Wash.
+Pythium sp., damping-off.
New Jersey - Summit, July 7. (Dept. Plant Path.)
+Sclerotium sp., rootrot.
*District of Columbia - Chevy Chase, July 18. (Brierley)

COTONEASTER (Cotoneaster sp.)
**+Bacteria - undet.
Minnesota - similar to fireblight of apples; very important; twigs blighted killed several two year old hedges to the ground; local in southern part of state; first time reported; abundant moisture in June favored plant growth, Steele Co., June 5. (Sect. Plant Path.)

CRAPEMYRTLE (Lagerstroemia sp.)
Uncinula australiana McAlp.?, oidial stage, powdery mildew.
**+South Carolina - on L. indica; unimportant; Charleston, May 27. (Ludwig)
**+Georiga - on L. parviflora; local; quite severe; Valdosta, July 1. (Boyd)
+Florida - the Oidium stage was very common; caused defoliation and dropping of flowers; perfect stage not found; Gainesville, Alachua Co., April 7. (West)
**+Alabama - Auburn, Lee Co., June 29. (Blair)
+Louisiana - common in southern part of state during the spring, continuing into the early part of July; first report for state. (Edgerton)
Texas - traces. (Taubenhaus)

CROTON (Codiaeum variegatum)
Gloeosporium sp., anthracnose.
Florida - Lantana, Palm Beach Co., June 25. (West). P.r.: Fla., N. J.
+Macrophoma sp.
Virginia - (Collins)

CROWNBEARD (Verbesina virginica)
+Coleosporium verbesinae Diet. & Holw., rust.
Florida - of frequent occurrence in the vicinity of Cocoa and on Merritts Island; both uredinial and telial stages occurring. (Rhoads)

CLAMEN (Cyclamen sp.)

Heterodera radicicola (Greef) Muell., nematode.

Butcher, R. W. Cyclamen wilt disease. Ann. Rep. Exp. & Res. Stat. Nursery & Mark. Gard. Industr. Devel. Soc. 10: 69-72. 1925. Primary cause Heterodera radicicola followed by an organism closely related to Bacillus mesentericus and B. vulgatus.

Ramularia sp.

+Delaware - a dying of leaves with conspicuous lesions at base; fungus found associated was a species of Ramularia; Wilmington, February. (Adams)

Bacterial rot

Munck, H. Knollenfaule der Cyklamen. Gartenw. 29: 704. 1925.

HLIA (Dahlia sp.)

Botrytis sp.

New Jersey - New Brunswick, August 24. (Dept. Plant Path.)

P.r.: Mich., N. J.

Cercospora sp., leafspot.

Florida - on D. pinnata; Gainesville, Alachua Co., August 5. (West)

+Choanephora americana Moll., blossom blight.

Florida - frequent; serious; local; Gainesville, Alachua Co., August. (West)

Corticium vagum Berk. & Curt., stemrot.

+Washington - Pierce Co. (Dept. Plant Path.) P.r.: Md.

Erysiphe cichoracearum DC., powdery mildew.

Connecticut - Westport, September 14. (Clinton)

+Delaware - Wilmington, September 17. (Adams)

+New Mexico - more prevalent; of some importance; Mesilla Park, Dona Ana Co., September. (Crawford)

Erysiphe sp., powdery mildew.

+Washington - Pierce Co. (Dept. Plant Path.)

Sclerotinia sclerotiorum (Lib.) Mass., stemrot.

+Maine - Orono, Penobscot Co., September 16. (Weiss). P.r.: Calif.

Leafspot - undet.

New York - Columbia Co., August 31. (Chupp)

Mosaic - undet.

Connecticut - Bridgeport, July 2. (Clinton)

+New Jersey - Woodstown, September 14. (Dept. Plant Path.) P.r.: Conn., Del.

Powdery mildew - undet.

Florida - on D. pinnata; Gainesville, Alachua Co., September 30. (West)

Stunt, Dwarf, Leafcurl - undet.

+Delaware - above names used by growers to describe symptoms which are identical with mosaic and leafroll symptoms on potato; more prevalent; a limiting factor in production. (Adams)

Maryland - I have had dahlia stunt under observation for several years, but have not attempted to isolate any organism or to transmit the disease by inoculation. At least those that I have attempted have not been successful. I find a number of conditions which cause dahlias to make little growth and few flowers that might all be included by various people under the name of "stunt". Sucking insect attacks, red spiders, bad weather conditions are responsible for some of the so-called "stunt", and the plants which are so affected do not produce stunted plants the following year. Anything which will interfere with the terminal growth, allowing side branches to develop will give a stunted bushy condition.

But there is a distinct disease carried over from year to year with the clump and its division which causes a bushy condition with 'few late flowers.' The plants with this disease are of a peculiar yellowish green. The leaves are much reduced in size and the flower is poor or absent. Apparently sometimes good plants will be produced from some of these poor clumps. Occasionally there are gardens where a great many plants are infected, but in general this disease does not seem to spread rapidly from plant to plant, and affected clumps are not apt to live overwinter in a great percentage. I have observed it for a number of years and have advised discarding any stunted clumps unless they are quite valuable varieties, in which case I would carry them over to see if the disease was continued next year. In that case discard them, but since there are so many dwarf conditions which are not carried over, a great many valuable plants could be saved by trying them the second year, without much danger of spreading the trouble.

There is no doubt that certain insects cause a great deal of stunt, especially in late summer, and it seems probable that some insects carry the stunt from plant to plant, so that any method of destroying sucking insects will aid in controlling both forms of stunt. (Norton)

Howe, M. A. So-called stunt in dahlias. Bull. Amer. Dahlia Soc. Ser. VI, No. 34: 22. Oct. 1925.

__________ Dahlias and their culture. Jour. New York Bot. Gard. 24: 169-187. Sept. 1923. "Stunt", p. 181-183. Reprinted in Flower Grower 11: 129-131; 172-174. Apr. & May, 1924.

__________ Dahlias and their cultivation. Massachusetts Hort. Soc. Yearbook 1925: 83-96. 1925. "Stunt", p. 92-93. Practically same as preceding article.

__________ The leafhopper as an enemy of the Dahlia. Bull. Amer. Dahli Soc. Ser. III, No. 22: 18, 26. Jan. 1922.

Diseases

Schenk, P. J. Plagen van dahlias. Floralia 46: 758-759. Nov. 1925.

DAISY, SHASTA (Chrysanthemum maximum)

+Pythium sp., damping-off.

New Jersey - Summit, July 7. (Dept. Plant Path.)

+Sclerotinia sclerotiorum (Lib.) Mass., stemrot.

Washington - Pierce County. (Dept. Plant Path.)

EUONYMUS ATROPURPUREUS - See Wahoo

FERN, SPLEENWORT (Asplenium sp.)

+Cercospora sp., leafspot.

Florida - not serious; Gainesville, Alachua Co., September 23. (West)

FERN, SWORD (Nephrolepis sp.)

Rust - undet.

South Carolina - unimportant; Greenville, May 25. (Fenner)

FLOWERING CRAB, CHINESE (Malus spectabilis hort. var.)

+Gymnosporangium juniperi-virginianae Schw., rust (Roestelia pyrata Thaxt.)

Connecticut - 17 reports; chiefly in nurseries; Cromwell, July 16. (Hunt

GERANIUM (Pelargonium sp.)
Bacterium erodii Lewis, bacterial leafspot.
Connecticut - Westport, October 8. (Clinton)
Indiana - LaFayette, March 11. (Gardner)
+Michigan - did considerable injury to beds of geraniums in Lansing City parks. (Nelson)
+Bacterium tumefaciens EFS. & Town., crowngall.
Ohio - Springfield, June 22. (Weiss)
Botrytis sp., grey mold.
+Minnesota - found in two greenhouses causing a loss of about 10 per cent of the cuttings; Minneapolis, October 13. (Div. Plant Path.)
Kansas - of slight importance; largely greenhouse trouble; B. cinerea type. (White). P.r.: Conn., Kans., *Fla., *La., Md., Mich., Ohio.
Cercospora brunkii Ell. & Gall., leafspot.
Florida - on rose geranium (P. graveolens); Gainesville, Alachua Co., July 29. (West). P.r.: Ala., *Miss., Texas.
Macrosporium sp., leafspot.
+Florida - Milton, Santa Rosa Co., September 14. (West).
P.r.: *Calif., *La., Mass.
Pythium spp. - P. debaryanum Hesse, P. debaryanum pelargonii Braun, and P. splendens Braun, stemrot.
District of Columbia - in greenhouse. (Braun, H. Comparative studies of Pythium debaryanum and two related species of geranium. Jour. Agr. Res. 30: 1043-1062. 1925)
+Mosaic - undet.
Indiana - LaFayette, October 8. (Gregory)
Minnesota - local in a greenhouse; Minneapolis, October 6. (Div. Plant Path.)
Dropsy - physiological
*+Louisiana - excessive soil water; Opelousas, June 1. (Weiss). P.r.: Ohio.

GLADIOLUS (Gladiolus sp.)
Bacterium gummisudans McC., bacterial blight.
Ohio - in northern part of state. (May)
Michigan - widespread and in many cases destructive. War, Anna Eberius and similar varieties generally very affected and unprofitable. (Nelson)
Minnesota - found only in three places, St. Paul, White Bear, and Hopkins; Van Fleet very heavily infected; University Farm, July 23. (Div. Plant Path.)
Bacterium marginatum McC., stemrot, scab.
+New York - probably wherever gladioli are grown in state; not very severe in any New York plantings examined. (Massey)
+Delaware - more prevalent than during last or average year; generally found in garden plantings; common in greenhouse on Alice Tiplady variety, Wilmington, May 8. (Adams)
Florida - caused considerable loss of young plants in propagation beds and severe scabbing of marketable corms; Jacksonville, Duval Co., May to August. (West)
*Indiana - all over state; serious. (Dietz)
+Ohio - in case reported one acre almost a total loss; variety Magra not affected; Schwaben and J. P. Shaylor only slightly affected. (May)

+Minnesota - less than in 1924 and of very little importance; found only around Twin Cities; very dry from July 1 to August 4 which, together with heat during same period, checked the disease to some extent. During the rainy period of latter part of September some infection of corms occurred, but for the most part the lesions did not go through the sheaths; corms were very badly scarred when planted in the spring; University Farm, July 22. (Div. Plant Path.)

+Cladosporium sp.

*Maryland - found fruiting on the tips of the floral bracts which were bleached and withered; the part of the fungus in causing the condition was doubted. (Weiss)

Fusarium sp., rot.

+Maine - reported from western edge of state. (Folsom)

New York - very common on variety Fire King; Long Island. (Massey)

+Florida - Gainesville, Alachua Co., September 11. (West)

+Kansas - Manhattan, June 5. (White)

Penicillium sp., dry rot of corms.

+Florida - not common or important; Ft. Pierce, St. Lucia Co., August 29. (West). P.r.: Colo., Miss., W. Va.

Septoria gladioli Pass., hardrot, leafspot.

New York - more severe than usual; general; causes a decay of corm in storage and a premature decay of planted corms, leaf stock, foliage, seedlings, and cormel stock; wet weather. (Massey)

New Jersey - less than usual; severe in some plantings. (Dept. Plant Path.)

+Ohio - one report. (May)

Minnesota - slight so far as observed; University Farm. (Div. Plant Path.)

P.r.: Ind., *Mich., Minn., Miss., *N. J., N. Y.

Pape, H. Die Hartfäule-Krankheit der Gladiolen und ihre Bekämpfung. Gartenw. 29: 676-680. 1925.

Hardrot - fungus undetermined.

Washington - Kitsap and Spokane Counties. (Dept. Plant Path.)

Disinfection

Lobner. Uspulun zum Beizen erkrankter Gladiolenzuiebeln. (Uspulun for the disinfection of diseased gladiolus bulbs.) Reprinted from Nachr. Landw. Abteil. Farbenfabriken vorm. F. Bayer & Co. Leverkusen bei Köln-am-Rhein, in Gartenflora 74: 157. 1925.

GOLDENCHAIN (Laburnum vulgare)

+Sporonema sp.

New York - (Collins)

GOLDENGLOW (Rudbeckia laciniata)

Erysiphe cichoracearum DC., powdery mildew.

+Delaware - more prevalent than usual; becoming more so in the fall. (Adams). P.r.: *Conn., Ind., *Md., *N. Y., *Ohio, W. Va.

+Sclerotium rolfsii Sacc., stemrot.

Florida - Gainesville, Alachua Co., September 8. (West)

GOURD, CALABASH (Lagenaria leucantha) (L. vulgaris)

Colletotrichum lagenarium (Pass.) Ell. & Hals., anthracnose.

+Connecticut - Fairfield, July 20. (Clinton). P.r.: Minn.

Pseudoperonospora cubensis (Berk. & Curt.) Rostew., downy mildew.

+Florida - Gainesville, Alachua Co., May 25. (West). P.r.: Conn.

HAW, BLACK (Viburnum prunifolium)
Hendersonia foliorum Fckl. var. viburni Sacc., leafspot.
+Florida - Gainesville, Alachua Co., Aug. 29. (West). P.r.: *Tex.

HELIOTROPE (Heliotropium sp.)
Heterodera radicicola (Greef) Muell., nematode.
Washington - Whitman Co. (Dept. Plant Path.)
+Tipburn
Pennsylvania - associated with leafhoppers, aphids; flea beetle injury also present; August. (Weiss)

HIBISCUS, CHINESE (Hibiscus rosa-sinensis)
+Mosaic - undet.
Florida - specimens showed characteristic symptoms and considerable dwarfing, St. Cloud, Osceola Co., June 13. (West)

HIBISCUS, ROSELLE (Hibiscus sabdariffa)
Phyllosticta sp., leafspot.
Palm, B. T. and S. C. J. Jochems. Een bladziekte van Roselle (Phyllosticta sp. on H. sabdariffa.) (A leaf disease of Roselle.) Indische Culturen 10: 391-393. July 1925.

HIBISCUS SP.
Heterodera radicicola (Greef) Muell., nematode.
Texas - trace. (Taubenhaus)
Phyllosticta sp.
+Florida - (Collins)
Root disease - undet.
Porto Rico - (Tucker)

HOLLY, AMERICAN (Ilex opaca)
Rhytisma curtisii Berk. & Rav., tarspot.
+Florida - Gainesville, Alachua Co., March 17. (West)
P.r.: *Ala., *Md., *S. Car., *Tex.

HOLLYGRAPE, CREEPING (Mahonia repens)
Uropyxis sanguinea (Pk.) Arth., rust.
Washington - Whitman Co. (Dept. Plant Path.)
P.r.: *Ariz., *Calif., *Colo., *Mont., N. Mex., *Oreg., *Utah, *Wash.

HOLLYHOCK (Althaea rosea)
Alternaria sp., leafspot.
+New York - Warwick, July 17. (Brierly). P.r.: Del., *Nebr.
Ascochyta althaeina Sacc. & Bizz., leafspot.
New York - Tompkins and Warwick, July 17. (Chupp) (Brierley)
+Heterodera radicicola (Greef) Muell., nematode.
Kansas - of slight importance; El Dorado; March 23. (White)
Puccinia malvacearum C. C. Bertero, rust.
New Mexico - common at State College; did considerable damage. (Crawford)
General throughout U. S. each year.

HYACINTH, COMMON (Hyacinthus orientalis)
Tylenchus dipsaci (Kuehn) Bast., stem and bulb nematode.
Has to date been reported only from Washington on this host.

HYDRANGEA, SMOOTH (Hydrangea arborescens)
+Cercospora arborescentis Tehon & Daniels, leafspot.
Illinois - Thebes, Alexander Co., August 17, 1922. (Mycol. 17: 246. 1925)

IRIS, COPPER (Iris fulva)
*+Puccinia iridis (DC.) Rabh., rust.
Indiana - Bluffton, Wells Co., September 8. (Weiss)

IRIS, GERMAN (Iris germanica)
Didymellina iridis (Desm.) Hoehn., leafspot.
+Oregon - Corvallis, May. (Barss)

IRIS, ROCKY MOUNTAIN (Iris missouriensis)
+Puccinia iridis (DC.) Rabh., rust.
Washington - Kittitas Co. (Dept. Plant Path.)

IRIS, BLUEFLAG (Iris versicolor)
Didymellina iridis (Desm.) Hoehn., leafspot.
*+Virginia - Norfolk, May 13. (McWhorter). P.r.: Ind.

IRIS, SPANISH (Iris xiphium)
*+Hardrot - undet.
Pennsylvania - Encountered several times this season. Affected bulbs are hard, almost bony in texture and where decay has been advanced, the bulb is readily crumbled. The decayed material was permeated with Penicillium. The outer surface shows scab like lesions, suggestive of insect or mechanical injury; interior of bulbs often showed insect burrows; Philadelphia, October 20. (Weiss)

IRIS (Iris sp.)
Bacillus carotovorus Jones, softrot.
New York - more prevalent than usual; severe in certain plantings; Tompkins and Westchester Counties, August. (Massey)
Minnesota - St. Paul, June. (Div. Plant Path.)
Corticium vagum Berk. & Curt., (Rhizoctonia solani), stemrot.
+Pennsylvania - (White)
+Kansas - locally severe; cortex decays, central stele sound; also found in Wichita in some roots just shipped in from an eastern state; Manhattan, Riley Co., May 11. (White). P.r.: Wash.
Didymellina iridis (Desm.) Hoehn., leafspot.
New York - wherever iris is grown in state; Westchester Co., August. (Massey)
Connecticut - Fairfield, July 20. (Clinton)
*Indiana - worse than usual; LaFayette, May 8. (Gardner)
Wisconsin - case reported severe; as a control would recommend for Wisconsin the removal of dead leaves in the spring; Waupaca, August 15. (Drechsler)
Minnesota - Hutchinson, July 25. (Div. Plant Path.)
Washington - Lewis, Pierce and Whitman Co. (Dept. Plant Path.)

Didymellina macrospora Kleb.

Klebahn, H. Über drei auf Iris gefundene Perithezien und die Zugehörigen Konidienpilze. Berichte Deutsche. Bot. Gesellsch. 42: 60-71. Apr. 1925. Differs from D. iridis by having larger spores.

Guignardia pullulans Kleb. (Sporotrichum pullulans)

Klebahn, H. See Didymellina macrospora.

Pleospora alternariae (Gibelli & Griffini) Kleb.

Klebahn, H. See Didymellina macrospora.

+Pythium sp., rootrot.

Connecticut - Wetherfield, July 9. (Clinton)

Sclerotium sp., crownrot.

Indiana - worst disease of the iris. (Gardner)

Diseases

Hoare, A. H. Iris diseases. Jour. Min. Agr. Great Britain 32: 454-458. Aug. 1925. Lists Didymellina iridis, Bacillus omnivorus, Puccinia iridis.

Toedt, S. Problems of iris grower. Prevention of rootrot. Lime is effective. Flor. Rev. 56: 33-34. 1925.

IVY, ENGLISH (Hedera helix)

+Guignardia sp.

Virginia - (Collins)

Phyllosticta concentrica Sacc., leafspot.

South Carolina - unimportant; local in two counties; Clemson College, May 1. (Fenner)

Phyllosticta hederaecola Dur. & Mont., leafspot.

New York - common; probably statewide. (Chupp)

JASMINE, ARABIAN (Jasminum sambac)

+Choanephora infundibulifera (Curry) Sacc., blossom blight.

Florida - Gainesville, Alachua Co., August 18. (West)

JASMINE (Jasminum sp.)

+Gloeosporium sp.

Florida - Miami, Dade Co., May 9. (West)

JERUSALEM CHERRY (Solanum pseudocapsicum)

+Heterodera radicicola (Greef) Muell., rootknot.

Oregon - on a number of potted plants at Eugene; both seed and soil in which plants were grown came from Eugene, April. (Barss)

LAUREL, MOUNTAIN - See Kalmia

LACEFLOWER (Trachymene caerulea)

Bacterial - undet.

Florida - Oneco, Manatee Co., January 17. (West)

LARKSPUR, ROCKET (Delphinium ajacis)

+Sclerotium rolfsii Sacc., stemrot.

Florida - Gainesville, Alachua Co., March 21. (West)

LARKSPUR, SIBERIAN (Delphinium grandiflorum)
+Sclerotium rolfsii Sacc., stemrot.
Florida - does considerable damage to this host; Daytonia, Volusia Co., March 31. (West)

LARKSPUR (Delphinium menziesii)
Puccinia clematidis (DC.) Lagh., rust.
Washington - Whitman Co. (Heald)

LARKSPUR, WILD (Delphinium trolliifolium)
Tylenchus dipsaci (Kuehn) Bast., stem nematode.
"The wild larkspur infestation was first found March 24 in a wood lot subject to overflow on the banks of Marys river a mile southwest of Corvallis. A week or two later I found another similar area about two miles farther upstream, same river. The infestation on the larkspur, Delphinium trolliifolium, results in a host reaction similar to that produced in other hosts, a dwarfing with hypertrophy and dark decomposition of stems at the crown which causes easy breaking at this point. Infestation was found within leaves as well as stems but no infestation of floral parts has been seen. As this plant is now mature no infestation can be located at the present time. I have collected seed which I have sent in for Doctor Steiner's use as he intends keeping the nema from this source alive for further investigation." (Bailey, May 22)

LARKSPUR (Delphinium sp.)
Bacterium delphini (EFS.) Bryan, blackspot.
Connecticut - Westville, June 2. (Clinton)
Erysiphe polygoni DC., powdery mildew.
+Washington - on a cultivated variety; King Co. (Dept. Plant Path.)
P.r.: Conn., *Me., Minn., *N. Y., *Pa., Wis.
+Pythium sp., damping-off.
New Jersey - Summit, July 7. (Dept. Plant Path.)
Sclerotium delphinii D. S. Welsh, crownrot.
*New York - annual variety; Hempstead, Long Island, June. (Weiss)
*+Maryland - Chevy Chase, August. (Weiss). P.r.: Ind., N. J., N. Y., Pa.
Sclerotium sp., crownrot.
*+Virginia - Greenwood, Albemarle Co., July 1. (Brierley)
Damping-off - undet.
Wisconsin - more prevalent than usual; major in early planting; causes a collapse at the collar of the seedlings; Maiden Rock, July 10. (Vaughan)
Mosaic or black blight - undet.
New York - reported several times. (Chupp)
Powdery mildew - undet.
Minnesota - Duluth, August 14. (Div. Plant Path.)
Rootrot - undet.
Maryland - probably due to bad soil conditions; Chevy Chase, May. (Weiss)

LAUREL, ENGLISH CHERRY (Laurocerasus officinalis)
Canker - undet.
Georgia - less than usual; southernmost counties in Coastal Plain; a disease of twig and shrub, causing many members to die outright; always associated with shot-hole; Thomas Co., September. (Boyd)

Shot-hole - undet.
*Georgia - probably bacterial; important locally; in southern part of state; always makes headway during the wet fall and winter months; Thomasville, June. (Boyd)

LILAC, COMMON (Syringa vulgaris)
Microsphaera alni (Wallr.) Wint., powdery mildew.
Reported from N. Y., Conn., N. J., Dela., Mo., Miss., Iowa, N. Mex.
Phyllosticta halstedii Ell. & Ev.
New York - (Grier, N. M. Unreported plants from Long Island, New York. Torreya 25: 33. Mar.-Apr. 1925.)

LILY, EASTER (Lilium longiflorum)
Mosaic - undet.
Florida - generally distributed throughout the state and serious; the worst disease of this host in the state. (West)

LILY, FALSE TIGER (Lilium maximowiczi)
Cercosporellose
Hiura, M. On a cercosporellose of the cultivated lily. Ann. Phytopath. Soc. Japan 1: 20-50. 1925. (Japanese with English summary.)

LILY, CHINESE SACRED (Narcissus tazetta orientalis)
+Fusarium sp., bulbrot.
Florida - Gainesville, Alachua Co., May 6. (West)

KALMIA (Kalmia latifolia)
Cercospora kalmiae Ell. & Ev., leafspot.
New Jersey - Middlesex Co., July. (Dept. Plant Path.). P.r.: Conn., *Pa.
Leafspot - undet.
South Carolina - Oconee Co., April 19. (Ludwig)

MARIGOLD, CAPE - See Cape-Marigold

MARIGOLD, FRENCH (Tagetes patula)
Yellows, probably
Pennsylvania - Philadelphia, August. (Weiss)

MARYLAND GOLDEN ASTER (Chrysopsis mariana)
+Coleosporium sp., rust.
Florida - Cocoa, Gainesville, and Rockledge, April 18. (Rhoads & West)

MICHAELMAS DAISY (Aster tradescanti)
Cephalosporium asteris Dowson (Verticillium vilmorinii)
Gram, E. and Sofie Rostrup. Oversigt over Sygdomme hos Landbrugets og Havebrugets Kulturplanter i 1924. (Survey of the diseases of agriculture and horticultural cultivated plants in 1924.) Tidsskr. for Planteavl. 31: 353-417. 1925.

MOCKORANGE, BIG SCENTLESS (Philadelphus grandiflorus)
Sarcinella heterospora Sacc., sooty blotch.
Florida - probably not serious but makes the leaves unsightly; Baker Co., July 17. (West)

MOCKORANGE, LEWIS (Philadelphus lewisi)
+Phyllactinia corylea (Pers.) Karst., powdery mildew.
Washington - Whitman Co. (Dept. Plant Path.)

MOONFLOWER (Calonyction aculeatum)
+Albugo ipomoeae-panduranae (Schw.) Sw., white rust.
Florida - Palmetto, Manatee Co., April 8. (West)

MORNING GLORY (Ipomoea sp.)
Albugo ipomoeae-panduranae (Schw.) Sw., white rust.
Reported from N. J., Fla., (I. pandurata, I. speciosa), N. Mex.
Cercospora alabamensis Atk., leafspot.
+New Jersey - Middlesex Co., September 25. (Dept. Plant Path.). P.r.: *Ala.

NARCISSUS (Narcissus sp.)
+Fusarium sp., plate rot.
+New Jersey - West Collingswood, November. (Weiss)
+Pennsylvania - Philadelphia, November. (Weiss)
+Missouri - Carterville, Jasper Co., September. (Weiss)
+Rhizopus nigricans Ehr., rot.
Oregon - Portland, August. (Drechsler)
Tylenchus dipsaci (Kuehn.) Bast., bulb nematode.
New York - specimens received from Long Island by Federal Horticultural Board.
New Jersey - specimens received by Federal Horticultural Board.
District of Columbia - reported by Godfrey in 1922 in lot of Golden Spur received from Holland. Found by Doctor Steiner in bulbs, 1925.
Virginia - found by Doctor Steiner in bulbs from two places in Virginia, 1925.
Washington - King Co. (Dept. Plant Path.)
Oregon - in a planting in Polk County, across the river from Salem, 24 per cent of the plants were affected this spring. The grower decided that he would not rogue out the diseased plants, but would leave them and use hot water treatment when they were dug. There were mites present also and when the bulbs were dug 30 per cent were so decayed that they were thrown away. This summer a number of growers from various sections treated trial lots of bulbs by the hot water method (111° F. for 3 hours) at a treating plant rigged up by a florist in Portland. If the results are satisfactory the growers intend to treat planting stock every year. If the treatment is continued too long or if it is done at the wrong time (before the flower bud is well developed) the flower will be injured, so forcing stock is not being treated, only planting stock. (McKay)
+White mold - undet.
Oregon - observed on Laurence Koster variety but may occur on others. Growers state that bulbs affected with this disease have to be dug up to avoid rot. This adds to labor costs, as bulbs are ordinarily left in the ground unless for some special reason. (McKay)

MYRTLE, TRUE (Myrtus communis)
+Sclerotium rolfsii Sacc.
Florida - completely annihilated a block of plants in small pots; Gainesville, Alachua Co., August 8. (West)

OLEANDER, COMMON (Nerium oleander)
Cercospora sp., leafspot.
+Florida - Gainesville, Alachua Co., September 28. (West)
+Cuscuta indecora, dodder.
Florida - St. Augustine, St. Johns Co., October 27. (West)
+Sphaeropsis sp., canker.
Florida - Hypoluxo, Palm Beach Co., October 22. (West)

PACHYSANDRA (Pachysandra sp.)
+Gloeosporium sp.
Virginia - (Collins)
Phyllosticta sp.
+Virginia - (Collins). P.r.: N. Car.

PANSY (Viola tricolor)
Cercospora macrospora Osterw., leafspot.
Osterwalder, A. Ueber die durch Cercospora macrospora Osterw. verursachte Blattkrankheit bei den Pansées. Mitt. Thruganisch Naturforsch. Ges. 25: 59-80. 1924.
Pythium debaryanum Hesse, damping-off.
+New Jersey - New Brunswick, May 18. (Dept. Plant Path.) P.r.: Conn.
Puccinia violae (Schum.) DC.
+Florida - Quincy, Gadsden Co., March 17. (West). P.r.: N. D., S. Car.
Yellows - undet.
District of Columbia - Among the many thousand pansy plants in the various beds in front of the Administration Building of the Department this spring there were several that showed a degeneration disease of the mosaic type. The plants were dwarfed, yellowed, and flowers small and inferior. The worst affected plants seem to be almost completely lacking in chlorophyll while others were only slightly mottled. There seemed to be no marked twisting or savoying of leaves but reduction in size and color only. Affected plants had a tendency to occur in groups or spots in the bed. (Haskell)

PALM, ARECA (Chrysalidocarpus lutescens) (Areca lutescens)
+Colletotrichum sp., anthracnose.
Florida - attacked the leaves and petioles of young plants near Pompano. (Seal)
Pestalozzia sp., leafspot.
Florida - little damage around Palm Beach. (Seal)

PALM (Cocos plumosa)
+Colletotrichum sp., anthracnose.
Florida - on leaves and petioles; of little importance. (Seal)

+Exosporium palmivorum Sacc., leafspot.
Florida - unimportant. (Seal)
+Graphiola phoenicis Poit., leafspot or false smut.
Florida - of little importance. (Seal)
+Pestalozzia sp., leafspot.
Florida - caused a spotting of young palms around West Palm Beach. (Seal)

PALM, SAGO CYCAS (Cycas revoluta)
+Alternaria sp., leafspot.
Florida - Jacksonville, Duval Co., August 8. (West)
+Lichen - undet.
Florida - in vicinity of St. Leo. (Seal)

PALM, KENTIA (Kentia sp.)
Colletotrichum sp., anthracnose.
Florida - attacked nursery plants in vicinity of Miami; apparently of considerable importance. (Seal).
Diplodia sp., leafspot.
+Florida - attacked nursery plants; unimportant; Miami. (Seal)
Phyllosticta sp., leafspot.
Florida - unimportant. (Seal)

PALM, CANARY DATE (Phoenix canariensis)
Exosporium palmivorum Sacc., leafspot.
+Florida - found in several nurseries in vicinity of Miami; of little importance. (Seal). P.r.: *La.
+Pestalozzia sp., leafspot.
Florida - found on old leaves of young plants kn the vicinity of Gainesville; little damage. (Seal)

PALM, ROYAL (Roystonea regia)
+Alternaria sp., leafspot.
Florida - unimportant. (Seal)
+Colletotrichum gloeosporioides Penz., anthracnose.
Florida - very common; caused breaking of petioles; of some importance in the nursery. (Seal)
+Diplodia sp., leafspot.
Florida - caused little damage. (Seal)
+Epicoccum neglectum Desm., leafspot.
Florida - caused little damage. (Seal)
+Fusarium sp., stem and root rot.
Florida - did some damage in nurseries in the southeastern counties. (Seal)
+Helminthosporium sp., leaf stripe.
Florida - rather common and of a serious nature in several nurseries in the vicinity of Miami. (Seal)
+Little leaf - cause unknown
Florida - found in a number of places; caused a curling and dwarfing of leaf; this disease is of economic importance as the plant may be destroyed in some cases. (Seal)

PALM, CALIFORNIA WASHINGTON (Washingtonia filifera)
+Ozonium omnivorum Shear, rootrot.
Texas - San Antonia, Bexar Co., December 2. (Blair)

PEACH, ORNAMENTAL (Amygdalus persica var.)
+Exoascus deformans (Berk.) Fckl., leafcurl.
Delaware - Woodside, May 20. (Adams)

PELARGONIUM - See Geranium

PEONY (Paeonia sp.)
Botrytis paeoniae Oud., blight.
New Hampshire - Peterboro, May 20. (Butler)
New York - a blight of young shoots, later caused bud blast; Westchester Co., April. (Massey)
Delaware - very prevalent in dense cluster of plants; Wyoming, May 22. (Adams)
Michigan - average amount; the most common and important peony disease in state; good results obtained in treating affected plants with copper carbonate. (Nelson)
Minnesota - St. Paul, May 1. (Div. Plant Path.)
*Idaho - Emmett, May. (Weiss)
Botrytis sp., blight.
Wisconsin - very common; major peony disease; leafspotting and bud blasting. (Vaughan)
*+Missouri - Diamond, May. (Weiss)
Washington - King, Pierce, and Skagit Counties (Puget Sound Region). (Dept. Plant Path.)
+Cercospora paeoniae Tehon & Daniels, leafspot.
Illinois - on P. officinalis; Prairie du Rocher, Randolph Co., August 24, 1922. (Mycol. 17: 247. Nov.-Dec. 1925)
Corticium vagum Berk. & Curt., stemrot.
*+Virginia - Batesville, May. (Drechsler)
+Cryptostictis paeoniae Tehon & Daniels
Illinois - on P. officinalis; Bloomfield, Johnson Co., July 25, 1922. (Mycol. 17: 243-244. 1925)
Heterodera radicicola (Greef) Muell., rootknot.
*+District of Columbia - August 3. (Weiss)
*Maryland - (Jehle)
Ohio - (May)
+Michigan - produced serious damage in a nursery; especially affected P. officinalis rosea; Oakland. (Nelson)
Minnesota - one report on var. Mons. Jules Elic which had been obtained from a nearby state; Rochester (September 16) and St. Paul. (Div. Plant Path.)
+Missouri - moderate damage; Carterville, Jasper Co., July 21. (Maneval)
Washington - King Co. (Dept. Plant Path.)
Verticillium albo-atrum Reinke & Berth., wilt.
Kansas - Atchison, Leavenworth, Wyandotte, and Shawnee Counties. (White)
Stemrot - undet.
Maryland - severe locally; Cambridge. (Jehle)
Lemoines' disease - undet.
Indiana - LaFayette, Tippecanoe Co., November 19. (Vaughan)

PERIWINKLE (Vinca minor)
+Colletotrichum sp., leafspot.
Florida - not serious; Bradentown (November 1) and Oakland (September 25). (West)

PETUNIA, COMMON (Petunia hybrida)
+Fusarium sp., wilt.
Washington - Whitman Co. (Dept. Plant Path.)
Mosaic - undet.
+South Carolina - unimportant; in a greenhouse; Florence, June 5. (Fenner)
P.r.: Conn., Iowa, La., Pa.

PETUNIA (Petunia violacea)
Mosaic
Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Sta. Res. Bul. 82: 39-91. 1925.

PHLOX (Phlox sp.)
Cercospora sp., leafspot.
New York - reported only from one locality; seems to be only on leaves injured by mites; Clinton Co., August 15. (Chupp)
Erysiphe cichoracearum DC., powdery mildew.
*Massachusetts - Fall River, September. (Weiss)
New York - Ulster Co., July 28. (Chupp)
Connecticut - average amount; Westville, July 5. (Clinton)
Sclerotium sp., rootrot.
*+Virginia - Oceana, June 30. (Brierley). P.r.: Ill.
Septoria sp., leafspot.
New York - probably statewide; Westchester Co., July. (Massey)
Sphaerotheca humuli (DC.) Burr., powdery mildew.
+New Hampshire - Franklin. (Butler)

POINCIANA, ROYAL (Poinciana regia)
Botryosphaeria ribis Gross. & Dug.
Florida - Homestead. (Mycol. 17: 99. May-June 1925)

POINSETTIA (Poinsettia havanensis)
+Uromyces proeminens (DC.) Pass., rust.
Florida - Miami, Dade Co., April 4. (West)

POINSETTIA (Poinsettia pulcherrima)
+Clitocybe tabescens Bres., rootrot.
Florida - causes considerable damage locally; Oakland, Orange Co., September 7. (West)
+Macrosporium sp., leafspot.
Florida - Gainesville, Alachua Co., August 22. (West)
+Ozonium omnivorum Shear, rootrot.
Texas - trace. (Taubenhaus)
Wet feet or wilt - undet.
Florida - plants wilted and finally died following the raising of the water table to the level of the roots several times at intervals of a week or ten days, Jacksonville, Duval Co., August 28. (West)

POPPY (Papaver sp.)
Rhizoctonia sp., rootrot.
Kansas - of slight importance; Tonganoxie. (White)

PRIMROSE, TOP (Primula obconica)
Leafspot - non-par.
+Pennsylvania - probably gas injury, originating from manufacturing plants around Pittsburg, August. (Foster)

PRIMROSE (Primula sp.)
Botrytis cinerea Auct., greymold.
+New Jersey - in greenhouse; New Brunswick, December 9. (Dept. Plant Path.)
P.r.: *D. C., Ohio, S. Car.
Mosaic - undet.
+Michigan - in one greenhouse several hundred plants showed symptoms of mosaic, resulting in total loss to the grower. (Nelson)
Damping-off - undet.
Wisconsin - major in several nurseries; one greenhouse lost over half its crop; controlled for six weeks with formaldehyde drench 1-30 before planting. (Fracker)

PRIVET, CALIFORNIA (Ligustrum ovalifolium)
Cercospora sp., leafspot.
+Florida - Gainesville, Alachua Co., October 11. (West)

PRIVET, EUROPEAN (Ligustrum vulgare)
Glomerella cingulata (Ston.) Spauld. & Schrenk, anthracnose.
Kansas - very destructive during past five years. Girdling cankers often produced at base of stem, killing entire plant. Wound inoculations successful on twigs of _L. vulgare_ but not on _L. amurense_, _L. ibota_, _L. regelianum_ or _L. ovalifolium_, nor does the disease occur naturally on any of the latter species, which fact leads to the suggestion that the latter species be substituted for _L. vulgare_ as a hedge plant where anthracnose is prevalent. (Mix, A. J. Phytopath. 15: 261-272. 1925)

QUINCE, FLOWERING (Cydonia japonica)
+Coryneum cydoniae Dearn. & House
New York - Skaneateles, Onondaga Co. (Dearness & House, New York Sta. Mus. Bul. 266: 93-94. June 1925)

RATTLE-BOX (Crotalaria sericea)
+Alternaria sp.
Florida - growing on ripened pods; Gainesville, Alachua Co., November 18. (West)
+Cercospora sp., leafspot.
Florida - Gainesville, Alachua Co., October 6. (West)
+Helminthosporium sp.
Florida - growing on ripened pods; Gainesville, Alachua Co., November 18. (West)

RATTLEBOX (Crotalaria spp.)
+Sclerotium rolfsii Sacc., stemrot.
Florida - on C. sericea; common but not serious; Gainesville, Alachua Co., October 10: On C. striata, Baldwin, Duval Co., July 22: On C. usariamoensis, Gainesville, Alachua Co., August 8. (West)

RHODODENDRON, ROSEBAY (Rhododendron maximum)
+Cercospora sp., leafspot.
Florida - Gainesville, Alachua Co., July 25. (West)
+Colletotrichum sp.
Florida - East Pensacola, Escambia Co., July 28. (West)

RHODODENDRON (Rhododendron sp.)
Phyllosticta maxima Ell. & Ev., leafspot.
New York - (Collins). P.r.: Conn., *D. C., Mass., *N. J., *N. Y.
Phyllosticta sp., leafspot.
+District of Columbia - (Collins). P.r.: Conn., Mass., *N. J., *N. Y.

ROSE (Rosa spp.)
Actinonema rosae (Lib.) Fr. - See Diplocarpon rosae Wolf
Bacterium tumefaciens EFS. & Town., crowngall.
+Georgia - severe in a few instances; both in nursery and lawn plantings; reported only from Thomas Co. (Boyd)
+California - disease general in many plantings; occasional severe losses especially in nurseries, one commercial greenhouse lost all their plantings; San Francisco region. (Horne)
Botrytis spp., bud blight.
+Georgia - important only in local greenhouses and where plants were freely irrigated out of doors; period of greatest injury was in April and May. (Boyd)
+Florida - (Waterman)
Cercospora rosicola Pass., leafspot.
Reported from Ga., Fla., and Porto Rico. In Florida it was second in importance to blackspot according to West.
Coniothyrium fuckelii Sacc. - See Leptosphaeria coniothyrium (Fckl.) Sacc.
+Corticium stevensii (Noack) Burt
Florida - reported once; Everglade, Lee Co., October 21. (West)
+Cuscuta paradoxa Raf., dodder.
Florida - reported once as doing considerable damage. (West)
+Cylindrosporium sp.
Maryland - on leaves and twigs. (Waterman)
Diaporthe umbrina Jenkins, brown canker.
+Florida - (Jenkins)
Diplocarpon rosae Wolf (Actinonema rosae (Lib.) Fr.), blackspot.
Reported from N. H., N. Y., Conn., N. J., Dela., Pa., Md., Va., Ky., S. Car., Ga., Fla., La., Texas, Mich., Kans., N. Mex., Wash., +Porto Rico. General in most cases reported.
+Fusicoccum sp.
Virginia - on stems and leaves. (Waterman)
Leptosphaeria coniothyrium (Fckl.) Sacc. (Coniothyrium fuckelii Sacc.), cane blight.
Reported from Pa., N. J., D. C., Md., Va., Miss., Texas, +Kans. In New Jersey it caused a dropping of scion on budded stock; severe in some nurseries. (Dept. Plant Path.)

Oidium sp., mildew.
+Porto Rico - (Tucker)
Phragmidium spp., rust.
Reported from N. Y. (P. subcorticinum), S. Car., Texas (P. speciosum), Kans., Colo., +N. Mex. (P. subcorticinum; general), Wash.
Sphaerotheca humuli (DC.) Burr., powdery mildew.
+Washington - on the Japanese rose. (Dept. Plant Path.)
Sphaerotheca pannosa (Wallr.) Lev., powdery mildew.
Reported from Mass., N. Y., Conn., N. J., Del., Md., Va., S. Car., Ga., Fla., La., Texas, Mich., Ill., Kans., Ariz., N. Mex., Idaho, Wash.
Blossom blight - undet.
Kansas - the isolations made from the diseased tissue remained sterile and diseased blossoms kept in damp chambers for a long period of time developed no fungus on the surface. A description of the blossoms may be of interest. The outer petals were brown and the outermost ones dry. The stem immediately below the bud to the distance of 1/4 to 1/2 inch was dry and shrivelled and dark brown. Due to my inability to obtain any fungus or organism from the necrotic tissue, I am of the opinion that it was due to some physiological cause. (White)
Chlorosis - due to too much lime.
Texas - prevalent. (Taubenhaus)
Recent literature on rose diseases.
Gregory, C. T. How to overcome rose troubles. Better Homes & Gardens 3: 8, 15, 87. 1925.
Heim, R. Les champignons parasites des rosiers. Jardinage 12: 28-29, 61-62, 90-91. 1925.
Lord, Elizabeth C. Roses in Florida. Florida Fruits & Flowers 2 (6): 136-137. 1925.
Shelley, A. D. G. Blackspot, Diplocarpon rosae (Actinonema rosae.) Nat. Rose Soc. Rose Ann. 1925: 133-138.

UBBERTREE, INDIA (Ficus elastica)
Colletotrichum sp., anthracnose.
+Florida - Ft. Myers, Lee Co., January 28. (West)
Leptostromella elasticae Ell. & Ev., leafspot.
+New Jersey - South Orange, January 8. (Dept. Plant Path.)

ALPIGLOSSIS (Salpiglossis sp.)
Fusarium sp., wilt.
Washington - Whitman Co. (Dept. Plant Path.)

KYFLOWER (Duranta plumieri)
+Sclerotium rolfsii Sacc., stemrot.
Florida - Gainesville, Alachua Co., August 20. (West)

NAKEROOT, WHITE (Eupatorium urticaefolium)
+Helicia buccina Dearn. & House
New York - Big Indian. (Dearness & House, New York St. Mus. Bull. 266: 91. June 1925)

NAPDRAGON (Antirrhinum majus)
Corticium vagum Berk. & Curt., rootrot.
New York - in gardens about Yonkers; season unusually wet; killed about 75 per cent of plants in a bed 100 x 4 ft. July and August. (Massey)

+District of Columbia - pull out diseased plants and water as little as possible. (Foster)

Phoma sp.

+Connecticut - associated with rust in producing a disease of the stems; Litchfield, August. (Clinton). P.r.: Ind., Mass., *Va.

Phyllosticta antirrhini Syd., leafspot.

New York - weather unusually wet; Yonkers, July. (Massey)

+New Jersey - Hackettstown, August. (Gilbert)

+Minnesota - Wayzata, July 9. (Div. Plant Path.)

Puccinia antirrhini Diet. & Holw., rust.

New York - both greenhouse and outdoor plants affected; Genesee and Jefferson Counties, June 30. (Chupp)

Connecticut - Litchfield, August. (Clinton & Hunt)

New Jersey - Princeton, July 23. (Dept. Plant Path.)

Delaware - very prevalent in greenhouse propagation. (Adams)

Virginia - very severe. (McWhorter)

+South Carolina - unimportant; Clinton, March 28. (Fenner)

Texas - trace. (Taubenhaus)

Indiana - serious in gardens late in season. (Mains). Very serious. (Gardner)

Wisconsin - of great importance; Madison, August 1. (Vaughan)

Michigan - very common in greenhouses; good control obtained by spraying with K_2S (liver of sulfur) 1 oz. to 2 gal. of water. (Nelson)

Minnesota - only one report but in that case a total loss of several hundred plants out of doors. (Div. Plant Path.)

Kansas - reported as severe in a few gardens. (White)

Washington - Pierce, Spokane, Whatcom and Whitman Counties. (Dept. Plant Path.)

Oregon - worst disease of the host; general in western part of state; Welches, September 13. (Barss)

Luedinghaus, E. How to control the snapdragon rust. West. Fruit 7: 8. 1925.

Thielavia basicola (Berk. & Curt.) Zopf, black rootrot.

+Connecticut - new host for state; Lyme, August 7. (McCormick). P.r.: N. J.

Verticillium sp., wilt.

New Jersey - Mercer and Morris Counties, September 14. (Dept. Plant Path.) P.r.: Mass.

SNOWBERRY (Symphoricarpos sp.)

Gloeosporium sp., anthracnose.

New York - Tompkins Co. (Chupp)

+Michigan - this disease occurs annually; quite general; disfigures the berries to a high degree also produces premature defoliation. (Nelson)

SNOWBERRY (Symphoricarpos occidentalis)

+Dothichiza symphoricarpi Petr.

North Dakota - Kulm. (Petrak, Ann. Myc. 23: 116-118. 1925)

SOURWOOD (Oxydendron arboreum)

+Sphaerella caroliniana Wolf, leafspot, +Sphaerulina polyspora Wolf, dieback, and +Venturia oxydendri Wolf.

North Carolina - eastern part of state. (Wolf, Jour. Elisha Mitchell Sci. Soc. 41: 94. Sept. 1925)

SPIREA, PINK MEADOW (Spiraea latifolia)
+Belonidium spiraeae Dearn. & House
New York - Indiana Pass and Newcomb, Essex Co. (Dearness & House, New York St. Mus. Bull. 266: 60-61. June 1925)

SWEETLEAF, COMMON (Symplocos tinctoria)
Exobasidium symploci Ell. & Mart., bud gall.
+Florida - Gainesville, Alachua Co., March 17. (West). P.r.: *Ala., Ind., Miss.

SWEETPEA (Lathyrus odoratus)
Corticium vagum Berk. & Curt., stemrot.
Florida - occasional over state; Apalachicola, Franklin Co., February 27; St. Augustine, November 20. (West)
Mycosphaerella pinodes (Berk. & Blox.) R. E. Stone, blight.
*Minnesota - only one report; was apparently responsible for 50 per cent loss of 1500 feet of host; Hopkins, June 29. (Div. Plant Path.)
Thielavia basicola (Berk. & Br.) Zopf, black rootrot.
New Jersey - Caldwell, February 5. (Dept. Plant Path.)
Mosaic - undet.
+New York - Warren and Westchester Counties, July 16. (Chupp & Massey)
Wisconsin - of major importance; Madison, July 10. (Vaughan)
+New Jersey - affecting one block constituting about 10 per cent of one entire house; infected block an entire loss; no aphids present at time though there may have been some earlier; no other plants present in house beside the host. (Weiss)
New Mexico - more prevalent than usual; of considerable importance; caused dwarfing and stunting of plants; especially severe on perennial variety; Mesilla Park, Dona Ana Co. (Crawford)

TULIP, COMMON (Tulipa gesneriana)
Botrytis tulipae (Lib.) E. F. Hopkins, Botrytis blight.
*+New York - Darwin and Cottage types seem to be most affected; the single varieties do not have it; Dutchess Co., May 18. (Chupp)
*Minnesota - only one report; a total loss of 60 Darwin Pride of Harlem bulbs which had been imported from Holland; Minneapolis, May 18. (Div. Plant Path.)
Washington - King and Pierce Counties. (Dept Plant Path.)
+Oregon - first year noticed. Very important. Known distribution in state, northern and middle western counties; also occurs in western Washington and British Columbia. Spring conditions (prolonged coolness and moisture) were apparently especially favorable. A number of specimens were received in early spring and later in the season. Edson and McKay visited tulip farms. One one-acre planting was said to be 100 per cent affected when the plants were in bloom. One florist did not get one marketable flower from some Holland bulbs that he forced. On the forced bulbs from this lot set out for hardening the sclerotia were exceedingly abundant. In many cases sclerotia were found on the base of the flower stalk left attached to the bulb after digging and also on old flower stalks left lying on the ground in the field. Flowers in one instance that had been sent from British Columbia to a show in Bellingham, Washington, were perfect when picked, but were covered with spots when the boxes were opened. These flowers were picked in the rain. (McKay)

Severance, L. S. Fire disease menace to tulips. Better Flow. 5: 8. Nov. 1925. Making serious appearances on Pacific Coast.

+Phytophthora cactorum (Leb. & Cohn) Schröt., blossom blight.

Illinois - Stevens, F. L. and O. A. Plunkett. Tulip Blossom Blight. Illinois Agr. Exp. Sta. Bull. 265: 299-307. 1925. A description is given of a disease of tulips that is attributed to Phytophthora cactorum. The flowers are attacked, and the flower stalk withers and falls over. The infection is usually through the flower, although the flower stalk and leaves may be directly attacked. Double tulips are said to be more subject to the blight than single ones. Moisture appears to be an important factor in the occurrence of the disease. Inoculation experiments with cultures of the organism showed that iris flowers were susceptible, and a damping-off of flax and sugar beet seedlings was brought about. The avoidance of situations that are especially humid is suggested as the only means for control.

Phytophthora sp., bulb rot.

+Washington - Whitman Co. (Dept. Plant Path.)

Rhizoctonia tuliparum (Kleb.) Whetzel & J. M. Arth.

Whetzel, H. H. and J. M. Arthur. The gray bulb rot of tulips caused by Rhizoctonia tuliparum (Kleb.) n. comb. New York Cornell Sta. Mem. 89: 5-18. 1925. Disease observed in New York in 1922, considered to be the same as that described in Germany by Klebahn as Sclerotium tuliparum. Steam sterilization or treating the soil with formalin gave satisfactory control. Some evidence that there are some bulbs which show immunity.

Slogteren, E. van. Iets over de ziekten der tulpen. Floralia 46: 547-549. Aug. 1925.

VERBENA (Verbena sp.)

Fusarium sp., wilt.

Washington - Whitman. (Dept. Plant Path.)

VIOLET (Viola sp.)

Cercospora violae Sacc., leafspot.

Georgia - very prevalent around middle of August both in nurseries and large beds on several estates, especially where watered artificially; a 10 per cent to 100 per cent loss in many beds; root knot aggravates the trouble. (Boyd)

Florida - generally distributed but not serious; St. Augustine, St. Johns Co., September 4. (West)

P.r.: *Fla., *Ga., *Ill., Iowa, *La., *Mass., *Minn., *Nebr., *N. Y., N. Car., Ohio, Pa., *S. Car., Texas.

+Cryptostictis violae Tehon & Daniels

Illinois - Rustville, Schuyler Co. (Tehon & Daniels. Mycol. 17: 244. Nov.-Dec. 1925)

Rhizoctonia sp.

Florida - Ocala, Marion Co., November 14. (West)

Thielavia basicola (Berk. & Br.) Zopf, black rootrot.

+Kansas - affected the greenhouse violets; Manhattan. (White)

VIRGINIA CREEPER - See Ampelopsis

VIRGIN'S BOWER (Clematis virginiana)
+Macrodiplodia clematidis Dearn. & House
New York - Selkirk, Albany Co. (Dearness & House, New York St. Mus. Bull. 266: 85. June 1925)

WAHOO (Euonymus atropurpureus)
Microsphaera euonymi (DC.) Sacc., powdery mildew.
+Kansas - slight; Manhattan, Riley Co., July 15. (White)

ZINNIA (Zinnia elegans)
Cercospora sp., leafspot.
Florida - caused local defoliation; Moncrief, Duval Co., September 17. (West)
Erysiphe cichoracearum DC., powdery mildew.
*+Virginia - Langley Field, September. (Weiss)
+Florida - general and serious; caused defoliation and stunting; Alachua and Volusia Counties, July 8. (West)
+Kansas - slight; Manhattan, August 1. (White)
+Delaware - very general. (Adams)
Texas - Limestone Co. (Taubenhaus)
Fusarium sp., wilt.
Washington - Spokane and Whitman Counties. (Dept. Plant Path.)
Mosaic - undet.
Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bull. 82: 39-91. 1925.

DISEASES OF MISCELLANEOUS PLANTS

ABUTILON THEOPHRASTI
+Cercospora abutilonis Tehon & Daniels
Illinois - Spring Valley, Bureau Co. (Tehon & Daniels, Mycol. 17: 246. 1925)
Mosaic - undet.
Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bull. 82: 39-91. 1925.

AEGILOPS CYLINDRICA
Puccinia clematidis (DC.) Lagh., rust.
Washington - Whitman Co. (Dept. Plant Path.)

ALLAMANDA NERIIFOLIA (Allamanda)
Colletotrichum gloeosporioides Penz.
Florida - St. Petersburg, Pinellas Co., April 20. (West)

ALLIUM TRICOCCUM
+Leptostroma allii Dearn. & House
New York - East Greenbush, Rensselaer Co. (Dearness & House, New York St. Mus. Bull. 266: 90. 1925)

AMARANTHUS RETROFLEXUS
Albugo bliti (Biv.) Kze., white rust.
Missouri - common every year; Columbia. (Maneval)

AMBROSIA TRIFIDA
Mosaic - undet.
*New York - diseased plants much dwarfed and leaves very plainly mottled; no attempts made to prove that it was a virus disease; Tompkins Co., May 20. (Chupp)

AMORPHA FRUTICOSA (Indigo bush)
Uropyxis amorphae (Curt.) Schroet., rust.
+Missouri - found every year; Columbia, Boone Co. (Maneval)
P.r.: *Ill., *Kans.

ANGELICA ATROPURPUREA
+Leptostromella angelicae Dearness & House
New York - on stem; North Greenbush, Rensselaer Co. (Dearness & House, New York St. Mus. Bull. 266: 90. 1925)

ARUM SP. (Arum)
Bacillus aroideae Town., soft rot.
Bewley, W. F. Soft rot of the arum. Ann. Rep. Exp. & Res. Stat. Nursery & Mark. Gard. Devel. Soc. 10: 74-75. 1925. Gives further recommendations for the control of the disease; recommends removal of diseased portions of the corms and thorough disinfecting with 2 per cent formaldehyde.

ASCLEPIAS SP. (Milkweed)
Mosaic - undet.
+Michigan - (Nelson). P.r.: N. Y., Wisc.

ASTER SP.
Erysiphe cichoracearum DC., powdery mildew.
Washington - Whitman Co. (Dept. Plant Path.)
P.r.: *Calif., *Ida., *Mont., *Nebr., *N. Y., *N. Dak., *Ohio, *Utah, *Wash., *Wyo.

AZALEA PERICLYMENOIDES
+Dendrophoma azalea Dearn. & House
New York - on branch and twig; Albany. (Dearness & House, New York St. Mus. Bull. 266: 84. 1925)

BACCHARIS SP.
Botryosphaeria ribis Gross. & Dug.
Florida - Flamingo. (Mycol. 17: 98. 1925)

BAPTISIA TINCTORIA (Yellow wild indigo)
Erysiphe polygoni DC., powdery mildew.
New Jersey - Spotswood, August 1. (Dept. Plant Path.)
P.r.: *Mass., *N. J., +Pa.

BIDENS CERNUA (Small burmarigold, stick-tight)
Oidium sp., powdery mildew.
+New Jersey - New Brunswick, September 25. (Dept. Plant Path.)

BIDENS SP.
Uromyces bidentis Lagh., rust.
+Florida - Miami, Dade Co., April 4. (West)

CAREX INTUMESCENS (Sedge)
+Puccinia intensicola Plowr., rust.
Florida - Gainesville, Alachua Co., April 17. (West)

CAREX LAEVIVAGINATA
+Dothidella caricina Dearn. & House
New York - Oneida, Madison Co. (Dearness & House, New York State Mus. Bull. 266: 69-70. 1925)

CAREX SP.
+Phaeoseptoria caricis Tehon & Daniels
Illinois - Ursa, Adams Co. (Tehon & Daniels, Mycol. 17: 245. 1925)

CHAMAECRISTA ASPERA
+Ravenelia cassiaecola Atk.
Florida - Apopka, Orange Co., September 29. (West)

CHENOPODIUM ALBUM (Pigweed)
Peronospora sp., downy mildew.
*+Maryland - Snow Hill, September 22. (Haskell)

CIRSIUM ARVENSE (Canada thistle)
Puccinia suaveolens (Pers.) Rostr., rust.
+Oregon - severe in cases reported; Willamette Valley. (Barss)
P.r.: *Me., *Mass., *N. J., *N. Y., Utah, *Vt., *Wis.
Septoria cirsii Niessl, leafspot.
+Pennsylvania - Tioga Co., July 3, 1924. (Kirby)
+Ohio - always appears late in the season, consequently is not of sufficient importance to cut short the activities of the host to any extent, Wooster, November 10. (Detmers). P.r.: Ind., N. Y.

CIRSIUM LANCEOLATUM
+Erysiphe sp., powdery mildew.
New Jersey - Oidium stage; severe infection; New Brunswick, September 12. (Dept. Plant Path.)

CYPERUS ROTUNDUS (Nut grass)
Puccinia canaliculata (Schw.) Lagh., rust.
+Florida - very common over entire state. (West). P.r.: Kans., *Miss.

DECODON VERTICILLATUS
+Cercospora decodontis Tehon & Daniels
Illinois - Wolf Lake, Union Co. (Tehon & Daniels, Mycol. 17: 246-247. 1925)

DESMODIUM TORTUSCUM (Beggar weed)
+Sclerotium rolfsii Sacc.
Florida - collected on the host in scattering places in fields; not common. (West)

ERIGERON SP.
Puccinia asterum (Schw.) Kern, rust.
Missouri - Columbia, May 5. (Maneval). P.r.: *Del., *Ind., *Iowa, *Kans., *Md., *Miss., *Mo., *Nebr., *Ohio, *Texas.

ERIOGONUM ELATUM
Erysiphe cichoracearum DC., powdery mildew.
Washington - Chelan Co. (Dept. Plant Path.)

ERODIUM CICUTARIUM (Alfilaria)
+Rhizoctonia sp.
Washington - Whitman Co. (Dept. Plant Path.)

ERYTHRONIUM ALBIDUM (White troutlily)
*+Ustilago heufleri Fckl., rust.
Missouri - rather common; reported in P.D.S. Supl. 37: 427, under E. americanum which was wrong; reported correctly this time; Columbia, April 18. (Maneval)

EUPATORIUM PURPUREUM (Joe-Pye weed)
Plasmopara halstedii Berl. & DeToni, downy mildew.
+Missouri - Columbia, May 19. (Maneval). P.r.: *Iowa, *Mich.

EUPHORBIA PRESLII
Uromyces proeminens (DC.) Lev., rust.
Missouri - Columbia, June 4. (Maneval)
Mosaic - undet.
Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bull. 82: 39-91. 1925.

FRAGARIA SP. (Wild strawberry)
Tylenchus dipsaci (Kuehn) Bast., stem nematode.
Oregon - occurs along coast within reach of sea spray in Coos, Lane, Lincoln, and Tillamook Counties. (McKay). P.r.: Oreg., Wash.

GEOBALANUS OBLONGIFOLIUS (Gopher apple)
+Glomerella cingulata (Ston.) Spauld. & Schrenk, bitter rot.
Florida - Ocoee, Orange Co., September 7. (West)

GERANIUM MACULATUM (Wild geranium)
Cercospora geranii Kell. & Sw., leafspot.
+Missouri - first report; Columbia, May 19. (Maneval). P.r.: Iowa.
Puccinia polygoni-amphibii Pers., rust.
*+Missouri - slight; Columbia, May 19. (Maneval)

GERANIUM VISCOSISSIMUM
Micropuccinia leveillei (Mont.) Arth. & Jack., rust.
Washington - Whitman Co. (Dept. Plant Path.). P.r.: *Wash.

GLYCYRRHIZA LEPIDOTA (Wild licorice)
Microsphaera diffusa Cke. & Pk., powdery mildew.
*+Washington - Usk, Pend Oreille Co., September 25. (Zundel).
P.r.: *Colo., *Mont.
Septoria glycyrrhizae Ell. & Kell., leafspot.
+Washington - Whitman Co. (Dept. Plant Path.). P.r.: Kans.
Uromyces glycyrrhizae (Rabh.) Magn., rust.
South Dakota - Brookings, June 26. (Evans). P.r.: *Calif., *Colo., *Ida., *Kans., *Mont., *Nebr., *Nev., *N. Dak., *Oreg., *S. Dak., *Utah, *Wash., *Wyo.

HELIOPSIS SCABRA
Mosaic - undet.
Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bull. 82: 39-91. 1925.

HEUCHERA GLABELLA
Micropuccinia heucherae (Schw.) Arth. & Jack., rust.
Washington - Whitman Co. (Dept. Plant Path.)

HYDROPHYLLUM ALBIFRONS
Puccinia apocryptum (Ell. & Town.) Kuntze, rust.
Washington - Whitman Co. (Dept. Plant Path.). P.r.: Ida., Oreg., *Wash.

LACTUCA SCARIOLA
+Marssonina panattoniana (Berl.) Magn., anthracnose.
Washington - Whitman Co. (Dept. Plant Path.)

LACTUCA SP.
Sphaerotheca castagnei Lév., powdery mildew.
+New Jersey - New Brunswick, September 12. (Dept. Plant Path.). P.r.: Ala.

LAGUNCULARIA SP.
+Botryosphaeria ribis Gross. & Dug.
Florida - Flamingo. (Mycol. 17: 98. 1925)

LEPIDIUM VIRGINICUM (Wild pepper grass)
Albugo candida (Pers.) Kuntze, white rust.
Florida - Miami. (Weber). P.r.: Ala., *Fla., *Ill., Ind., Iowa, *Kans., *Miss., Wis.
Peronospora parasitica (Pers.) D By., downy mildew.
+New York - (Grier, N. M. Unreported plants from Long Island, New York. Torreya 25: 29. 1925)

LEPTILON CANADENSE (Erigeron canadensis)
+Yellows - undet.
Michigan - a disease in effect resembling aster yellows has been noted for past two years on this plant. (Nelson)

LEUCOTHOE SP.
Phyllosticta terminalis Ell. & Mart., leafspot.
New York - Long Island. (Grier, N. M. Unreported plants from Long Island, N. Y. Torreya 25: 33. 1925)

LOMATIUM GRAYI
Allodus jonesii (Pk.) Arth., rust.
Washington - Whitman Co. (Dept. Plant Path.). P.r.: *Wash.

LUCUMA SP.
+Physalospora malorum (Pk.) Shear & Stevens
South Carolina - Society Hill. (Mycol. 17: 99. 1925)

LUPINUS DIFFUSUS
Cercospora lupini Cke., leafspot.
*+Florida - Babson Park, April 30. (Jenkins). P.r.: *S. Car.

LUPINUS SP.
Erysiphe polygoni DC., powdery mildew.
New Jersey - Spotswood, August 1. (Dept. Plant Path.)
P.r.: *Colo., Ida., *Ill., *Md., *Mass., *Mich., *Mo., *Mont., *N. J., *N. Y., *Ohio, *Wash., *Wyo.

LYONIA FERRUGINEA
+Phacidium vaccinii Fr., leafspot.
Florida - Gainesville, Alachua Co., March 17. (West)

MEDICAGO ARABICA (Bur clover) (M. maculata)
+Pseudoplea medicaginis Miles
Alabama - on leaf, stem, peduncle, petiole, calyx, corolla, seed; Auburn. (Miles. Leafspot of bur clover. Phytopath. 15: 688-689. Nov. 1925)

MENTHA CANADENSIS
+Cercospora menthicola Tehon & Daniels
Illinois - Fayette (Vandalia) and Johnson (Goreville) Counties. (Tehon & Daniels. Mycol. 17: 247. 1925)
Puccinia menthae Pers., rust.
Washington - Kitsap Co. (Dept. Plant Path.) P.r.: *Calif., *Colo., *Idaho, *Ill., *Ind., *Iowa, *Kans., *Mass., *Mont., *Nebr., *N. Y., *N. Dak., *Oreg., *S. Dak., *Wash., *Wis., *Wyo.

MENTHA SP. (Mint)
+Verticillium sp. (?), wilt.
Michigan - under observation and investigation during past two years; very serious on one peppermint farm causing heavy losses, Kalamazoo Co. (Nelson)

NEPETA CATARIA
Mosaic
Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bull. 82: 39-91. 1925.

NICOTIANA ALATA
Mosaic
Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bull. 82: 39-91. 1925.

OENOTHERA SP. (Evening primrose)
Erysiphe polygoni DC., powdery mildew.
+New Jersey - Middlesex Co., August 14. (Dept. Plant Path.)
P.r.: Ala., *Ida., Iowa, Minn., *Nebr., N. Y., *N. Dak., *Wash.

PHOTINIA ARBUTIFOLIA
+Fusicladium photinicola McClain
California - on leaf and berry. (McClain, Phytopath. 15: 181-182. 1925)

PHYTOLACCA AMERICANA (P. decandra) (Common poke-berry)
Mosaic - undet.
+Florida - Gainesville, Alachua Co., March 17. (West). P.r.: *N. Y.

PLANTAGO SP. (Plantain)
Erysiphe cichoracearum DC., powdery mildew.
*New York - Suffolk Co., October 16. (M. W. Gilbert)
*+South Carolina - Plantago rugelii; Calhoun, June 18. (Ludwig)
Physarum cinereum (Batsch.) Pers., slimemold.
+New Jersey - Brooklawn, August 8. (Dept. Plant Path.) P.r.: Nebr., *Pa.
Ramularia plantaginis Ell. & Mart., leafspot.
*+South Carolina - Calhoun, June 2. (Ludwig). P.r.: *Ill., *Ind., *Ky., *Me., *Mich., *Minn., *Nebr., *N. J., *Ohio, *Wis.
+Sphaerotheca humuli fuliginea (Schlect.) Salm., powdery mildew.
New Jersey - New Brunswick, September 10. (Dept. Plant Path.)

PODOPHYLLUM PELTATUM (Mandrake, Mayapple)
Puccinia podophylli Schw., rust.
Whetzel, H. H., H. S. Jackson, and E. B. Mains. The composite life history of Puccinia podophylli Schw. Jour. Agr. Res. 30: 65-79. 1925.
+Rhizoctonia sp.
Missouri - caused decay of green fruits and leaf bases; leaf-base decay so bad that leaves dropped off; sclerotia were produced in moist chamber; first report; found only in one place at Columbia; May 12. (Maneval)

POLYGONUM AVICULARE
Erysiphe polygoni DC., powdery mildew.
+New Jersey - New Brunswick, August 6. (Dept. Plant Path.)

POTENTILLA BLASCHKEANA
Phragmidium ivesiae Syd., rust.
+Washington - Whitman Co. (Dept. Plant Path.)
+Sphaerotheca humuli (DC.) Burr., powdery mildew.
Washington - Whitman Co. (Dept. Plant Path.)

POTENTILLA MONSPELIENSIS
Beloniella dehnii (Rabh.) Rehm (Mollisia dehnii (Rabh.) Karst.)
+Missouri - Boone Co. (Maneval). P.r.: Ind., Iowa, N. Dak., Pa.

RIBES AMERICANUM (American black currant)
Cronartium ribicola Fisch., blister rust.
Connecticut - Danielson, August 12. (Clinton). P.r.: Mich., N. H.

RIBES MISSOURIENSIS
+Clypeopycnis aeruginascens Petr.
South Dakota - Northville. (Petrak, Ann. Myc. 23: 76-77. 1925)

RIBES VULGARE (Common red currant)
Cronartium ribicola Fisch., blister rust.
Connecticut - Rickfall, July 29. (Clinton & Hunt). P.r.: Mich.

RUBUS SETOSUS
+Bacterium tumefaciens EFS. & Town., crowngall.
New York - found by Prof. Whetzel on this host which commonly grows wild in the swamps. (Chupp & Pierstorff)

RUMEX SP.
Ovularia obliqua (Cke.) Oud., leafspot.
Missouri - Columbia, October 31. (Maneval). P.r.: Ala., *La., *Mass., *Mich., *Mo., *Nebr., *N. Y.

SCROPHULARIA MARILANDICA
Septoria scrophulariae Pk.
Missouri - Columbia, May 5. (Maneval). P.r.: *Ark., *Colo., *Ind., *Iowa, *Minn., *Miss., *Mo., *Nebr., *N. Y., *Ohio, Wash.

SEDUM SP. (Stonecrop)
Septoria sedi West, leafspot.
Maine - collected in southwestern part of state. (Folsom). P.r.: N. Y.

SENECIO SP.
+Erysiphe sp., powdery mildew.
Washington - Whitman Co. (Dept. Plant Path.)

SESBANIA VESICARIUM
Erysiphe polygoni DC., powdery mildew.
Florida - occasionally found; not important. (Weber)

SISYMBRIUM ALTISSIMUM (Tall sisymbrium)
Albugo candida (Pers.) Kuntze, white rust.
+Washington - Walla Walla and Whitman Counties. (Dept. Plant Path.)
P.r.: *Mont., *N. Y.

SMILAX GLAUCA
+Phyllosticta smilacis Ell. & Ev., leafspot.
New York - Long Island. (Grier, N. M. Unreported plants from Long Island, N. Y. Torreya 25: 33. 1925)

SOLANUM VILLOSUM
+Erysiphe cichoracearum DC., powdery mildew.
Washington - Asotin and Whitman Counties. (Dept. Plant Path.)

SMILACINA RACEMOSA
+Colletotrichum smilacinae Tehon & Daniels
Illinois - Goreville, Johnson Co. (Tehon & Daniels. Mycol. 17: 245-246. 1925)

SMILAX LAURIFOLIA
Cercospora sp., leafspot.
+Florida - Cocoa, Brevard Co., October 24. (West)

SOLIDAGO MISSOURIENSIS
+Diaporthe leariformis Petr.
North Dakota - Kulm (Petrak, Ann. Mycol. 23: 72-74. 1925)
+Sydowiella dakotensis Petr.
North Dakota - Kulm. (Petrak, Ann. Myc. 23: 74-75. 1925)

SOLIDAGO (?) SP.
+Helminthosporium naviculatum Dearn. & House
New York - Bethlehem, Albany Co. (New York St. Mus. Bull. 266: 96. 1925)

STOKESIA LAEVIS
Mosaic - undet.
Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bull. 82: 39-91. 1925.

SYMPLOCARPUS FOETIDUS
+Botrytis cinerea Pers., rot.
New York - on leaves; Long Island. (Grier, N. M. Unreported plants from Long Island. Torreya 25: 33. 1925)

TAENIDIA INTEGERRIMA
Bullaria bullata (Pers.) Arth., rust.
*+Missouri - Columbia, April 7. (Maneval). P.r.: *Ind., *N. Y.

TARAXACUM OFFICINALE (Dandelion)
Ramularia taraxaci Karst., leafspot.
Washington - Whitman Co. (Dept. Plant Path.)
Sphaerotheca castagnei Lev., powdery mildew.
New Jersey - found on commercial plantings of dandelion; Paterson, September 14. (Dept. Plant Path.) P.r.: Conn., Ill., Mo., N. Y., N. Dak.

TOVARA VIRGINIANA
+Rhabdospora polygoni Dearn. & House
New York - East Greenbush, Rensselaer Co. (Dearness & House, New York St. Mus. Bull. 266: 89. 1925)

TRIGLOCHIN PALUSTRIS
+Pleospora herbarum triglochinia Dearn. & House
New York - Bergen Swamp, Genesee Co. (Dearness & House, New York St. Mus. Bull. 266: 75. 1925)

TRILLIUM SESSILE
Septoria trillii Pk., leafspot.
Missouri - Columbia, April 19. (Maneval)
*+South Carolina - Clemson College, June. (Ludwig). P.r.: Ind., *Md., *Mo.

VACCINIUM CORYMBOSUM
Phyllosticta cyanococci Dearn. & House
New York - Newcomb, Essex County. (Dearness & House)

VACCINIUM MACROPHYLLUM
Calyptospora columnaris (Alb. & Schw.) Kuehn, stem rust.
Washington - Kitsap Co. (Dept. Plant Path.)

VACCINIUM OXYCOCCUS
+Lophodermium oxycocci (Fr.) Karst. var. hypophyllum Dearn. & House
New York - Tahawas, Essex Co. (Dearness & House, New York St. Mus. Bull. 266: 65-66. 1925)

VERBESINA VIRGINICA
+Coleosporium helianthi (Schw.) Arth. (C. verbesinae Diet. & Holw.), rust.
Florida - Cocoa, Brevard Co., October 24. (West)

VERNONIA SP. (Ironweed)
Coleosporium carneum (Bosc.) Jackson (C. vernoniae Berk. & Curt.), rust.
+Florida - Alachua and Marion Co., August 30. (West)

VIBURNUM SP.
+Physalospora malorum (Pk.) Shear & Stevens
South Carolina - Aiken. (Mycol. 17: 99. 1925)

VIBURNUM CASSINOIDES
+Micropeltis viburni Dearn. & House
New York - Newcomb, Essex Co. (New York St. Mus. Bull. 266: 68. June 1925)

XANTHIUM GLABRATUM (Cockle burr)
+Erysiphe cichoracearum DC., powdery mildew.
Florida - common. (Weber)

ZYGADENUS MUSCAETOXICUS (Crowpoison)
Puccinia atropuncta Pk. & Clint., rust.
Orton, C. R. and Freeman Weiss. The life cycle of the rust on fly poison, Chrosperma muscaetoxicum. (Mycol. 17: 148-153. 1925)

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BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

INDEX OF ORGANISMS AND NON-PARASITIC DISEASES IN PLANT DISEASE REPORTER SUPPLEMENTS XLV--L, 1926

Plant Disease Reporter
Supplement 51

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Prepared by Mary G. Van Meter

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ERRATA AND EXPLANATION

Page

249 Read "Cercosporella persic<u>ae</u>" instead of "C. persic<u>a</u>".

282 In last two lines on page the report of melanose on orange in Arizona erroneous. Disease not known to occur in that state.

323 Read "Gibberella saubine<u>tii</u>" instead of "G. saubine<u>tti</u>".

369 Read "Gloeosporium c<u>aul</u>ivorum" instead of "G. c<u>ali</u>vorum".

380 Read "Bromus hordeaceus" instead of "B. hordeace<u>o</u>us.

399 Read "<u>Bacterium</u> solanacearum" instead of "<u>Bacillus</u> solanacearum".

435 Read "Hypoxylon pruninatu<u>m</u>" instead of "H. pruinatu<u>n</u>".

437 Read "Marasmius m<u>u</u>sicola" instead of "M. m<u>i</u>sicola".

438 Read "Stysanus" instead of "Stysa<u>n</u>sus".

470 Read "Dendrophoma azalea<u>e</u>" instead of azalea".

472 Read "Desmodium tortu<u>os</u>um" instead of "D. tortu<u>sc</u>um."